



COORDINATED HIGHWAYS ACTION RESPONSE TEAM
STATE HIGHWAY ADMINISTRATION

WO 42 LCP Phase 3, Mapping R15 and ATMS 13.2 Detailed Design

**Contract SHA-06-CHART
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By
CSC**



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1 Introduction

1.1 Purpose

This document describes the high level design of the software for Lane Closure Permits (LCP) Phase 3, CHART Mapping R15 and CHART ATMS 13.2.

Following is a summary of the major features provided by LCP Phase 3/ CHART Mapping R15 and CHART ATMS 13.2:

- **Permit Archive/Server Jobs**

LCP Phase 3 will implement a permit data archive that will reside within the overall LCP application. This archive will provide the ability to separate permits into those permits that are currently needed for day to day operations and the permits that have been in the “expired” state for a period of sixty days and are no longer needed for day to day operations. These expired permits will be classified as “archived” and will be moved daily into database tables that are distinctly separate from those used to store current permits thereby reducing the number of permit records that need to be traversed by the application during daily use by district and SOC operational staff.

- **Search Permits**

The LCP Phase 1 Release provided the ability for a user to list the permits in the application and to perform simple searches and filtering. The LCP Phase 3 release will enhance that capability by providing performance enhancements combined with additional search functionality. Performance upgrades will be achieved through updates to both the user interface as well as server side improvements to the way permit records are retrieved and sent to the user interface. In addition, the LCP Phase 3 Release will expand the search capabilities to allow the search results to include those permits that have been archived in the application as well as displaying visual cues to distinguish archived from non-archived permits.

- **LCP Data Exporter**

A new set of web services is included in Phase 3 to allow external systems such as the Intranet Map application to connect to LCP to retrieve permit information. These new services also provide faster permit data update for Intranet map and public CHART Web. The LCP Data Exporter also provides the ability for an external application to subscribe to and receive updates as permit data changes.

- **PRs**

- PR7114: LCP: Update username and password rules
 - Removes the requirement for any special characters in the password. They can still be used at the discretion of the user but not required by the application.

- Modifies LCP to remove the restriction that previous password can not be reused.
 - New Passwords will now require minimum of 1 capital letter, minimum of 1 lower case letter, minimum length of 8 characters, a maximum length of 32 characters, restrict the use of any white space, and allow special characters but not require it.
 - Update LCP application to simplify the passwords that are generated for users when recovering lost passwords. Easy to read passwords with characters and/or numbers and no special characters.
 - User name lengths will range from 4–32 characters.
 - Logon names can only contain alphanumeric characters
- PR7118: LCP: LCP export to ATMS not providing data for all permits
- The LCP application will no longer provide a bit masked representation of lane configuration data to ATMS. Instead, this data will be provided as a simple text string. Changes to Chart_Permit_View will be made to send the text to ATMS.

- **Intranet Map Updates**

CHART Mapping R15 provides users with the ability to filter the barrels displayed for active, planned or pending closures by district(s) on the map. The legend for the Intranet Map is being enhanced in this release to provide the list of district(s) for selection by the user. The districts that will be available for selection on the legend display are:

- District 1
- District 2
- District 3
- District 4
- District 5
- District 6
- District 7
- MDTA (Maryland Transportation Authority).

Additional changes to the legend include removing the capability to display Closure Segments for Planned, Pending and Active lane closure permits on the Intranet Map. The Hauling Restriction Segments legend item is being moved under the Roadwork level along with Route and Area Restrictions.

The Intranet Map currently provides the capability for the user to map or unmap a permit when transitioned from the LCP web interface. CHART Mapping R15 will add the ability to notify the external LCP web service regarding user initiated changes to the

geographical location for the permit. This change will ensure the two systems are in synch with changes performed regarding permits.

- **Export Client**

CHART ATMS 13.2 will supplement export client with a new “permits” module that will be responsible for keeping the permits data cache in the system database upto date. The export client will subscribe, authenticate and query permit data from the external LCP Data Exporter. The messages exchanged between the export client and LCP Data exporter will comply with the published ICD and xsd.

On startup and at periodic intervals, export client will initiate a full inventory request to synchronize the permits stored in the system database cache. In the interim it will rely on the subscription updates provided by the external LCP Data Exporter to keep its cache current.

Imported permits data will be available for viewing only on the Intranet Map website.

1.2 Objectives

The main objective of this detailed design document is to provide software developers with a framework in which to implement the requirements identified in the LCP Phase 3 Requirements validation document.

1.3 Scope

This design is limited to Phase 3 of the LCP system and associated Mapping application updates. This design does not include designs for components implemented in other releases of the LCP or CHART systems.

1.4 Design Process

This design is based on a series of Joint Application Design (JAD) sessions that were held with developers, stake holders, and users. The user interface design is included in this document in the Human Machine Interface section. The requirements have been captured as UML Use Case diagrams, also included in this document. The use case diagrams will be the basis for detailed design.

1.5 Design Tools

The use case diagrams, database diagrams, sequence diagrams and state diagrams will be extracted from the Visual Studio 2013 design tool. Within this tool, the design will be contained in the project named “LCP” in the folder named “Phase 3”.

The work products contained within this design for CHART Mapping R15 were extracted from the Enterprise Architect design tool. Within this tool, the design is contained in the project named “chartdesign” in the folder named “CHART-Mapping-R15”

1.6 Work Products

This design document includes the following work products:

- Architecture diagram, showing the high level architecture of components related to this project.
- Human-Machine Interface section which provides descriptions of the screens that are changing or being added in order to allow the user to perform the described uses.
- Use Case diagrams that capture the requirements of the system.
- UML Class diagrams, showing the software objects which allow the system to accommodate the uses of the system described in the Use Case Diagrams.
- UML Sequence diagrams showing how the classes interact to accomplish major functions of the system.
- Requirement Verification Traceability Matrix that shows the mapping of specific requirements to use cases.

2 Architecture

LCP Architecture The sections below discuss specific elements of the architecture and software components that are created, changed, or used in LCP Phase 3.

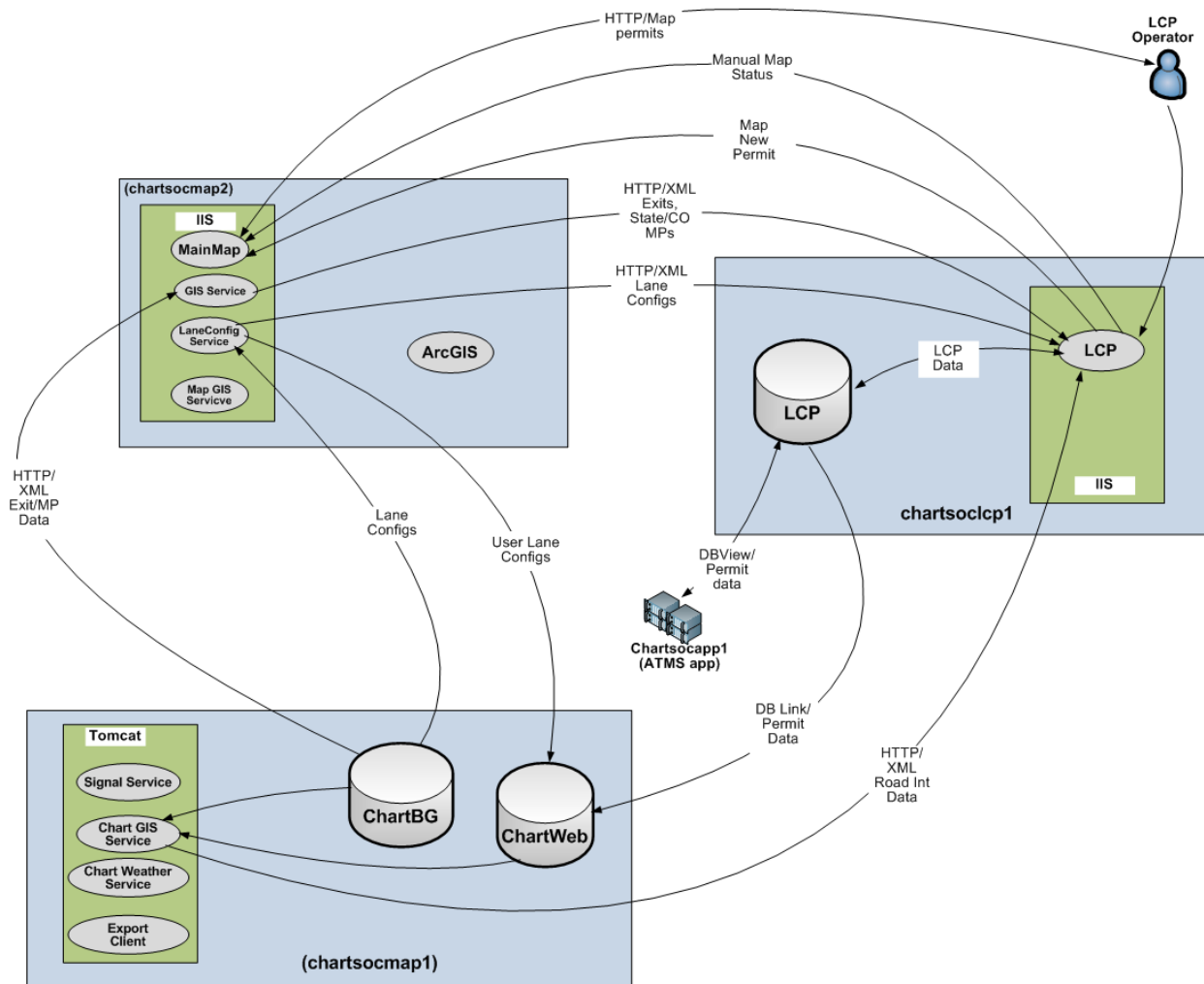


Figure 2-1 LCP/CHART Mapping Architecture Diagram

2.1 Network/Hardware

2.1.1 LCP

The LCP Phase 3 release will not require that a new server be added to the MDOT network. This release will utilize the existing LCP ASP.NET web server and Microsoft SQL Server database.

2.2 Software

2.2.1 LCP

LCP Phase 3 will use the Microsoft .NET Framework and ASP.NET MVC architecture for web application development. Data access will utilize the ADO.NET Entity Framework to perform Object-Relational Mapping for domain-specific objects.

2.2.2 COTS Products

Product Name	Description
Microsoft .Net Framework	LCP Release 3 will be built on the Microsoft .Net framework.
ASP.Net MVC	LCP Release 3 will use the ASP.NET Framework as the web application architecture. ASP.NET MVC implements the model-view-controller design pattern.
Microsoft SQL Server	LCP Release 3 uses Microsoft SQL Server as its database.
Microsoft Entity Framework	LCP Release 3 uses the Microsoft Entity Framework for data access.
JQuery	LCP Release 3 uses JQuery and JQuery plug-in for client side GUI manipulation and AJAX requests to the server.
Log4Net	LCP Release 3 uses Log4Net to log application errors.
SecurityGuard	LCP Release 3 uses SecurityGuard for membership management.
GeoAPI	GeoAPI.NET project provides a common framework based on OGC/ISO standards to improve interoperability among .NET GIS projects. GeoAPI is open source product realized under GOL license which can be found at svn\LCP\cots\license.txt
NetTopologySuite	The JTS Topology Suite is an API for modeling and manipulating 2-dimensional linear geometry. It provides numerous geometric predicates and functions. JTS conforms to the Simple Features Specification for SQL published by the Open GIS Consortium.
ArcGIS Server 10.1.1 Advanced Enterprise	ESRI Map server and ArcSDE for geodatabase included
Log4J	CHART ATMS uses the log4J version 1.2.15 for logging purposes

Product Name	Description
Java Run-Time (JRE)	CHART ATMS Export Client uses 1.7.0_45.
JDOM	CHART ATMS Export Client uses JDOM b7 (beta-7) dated 2001-07-07. JDOM provides a way to represent an XML document for easy and efficient reading, manipulation, and writing
JAXB	CHART ATMS Export Client uses the jaxb java library to automate the tedious task of hand-coding field-by-field XML translation and validation for exported data.
Apache Tomcat	CHART ATMS Export Client uses Apache Tomcat 7.0.47 as the host server

2.2.3 Deployment Interface Compatibility

The sections below contain more detailed information related to interfaces in the CHART and LCP systems, including the interface describe above.

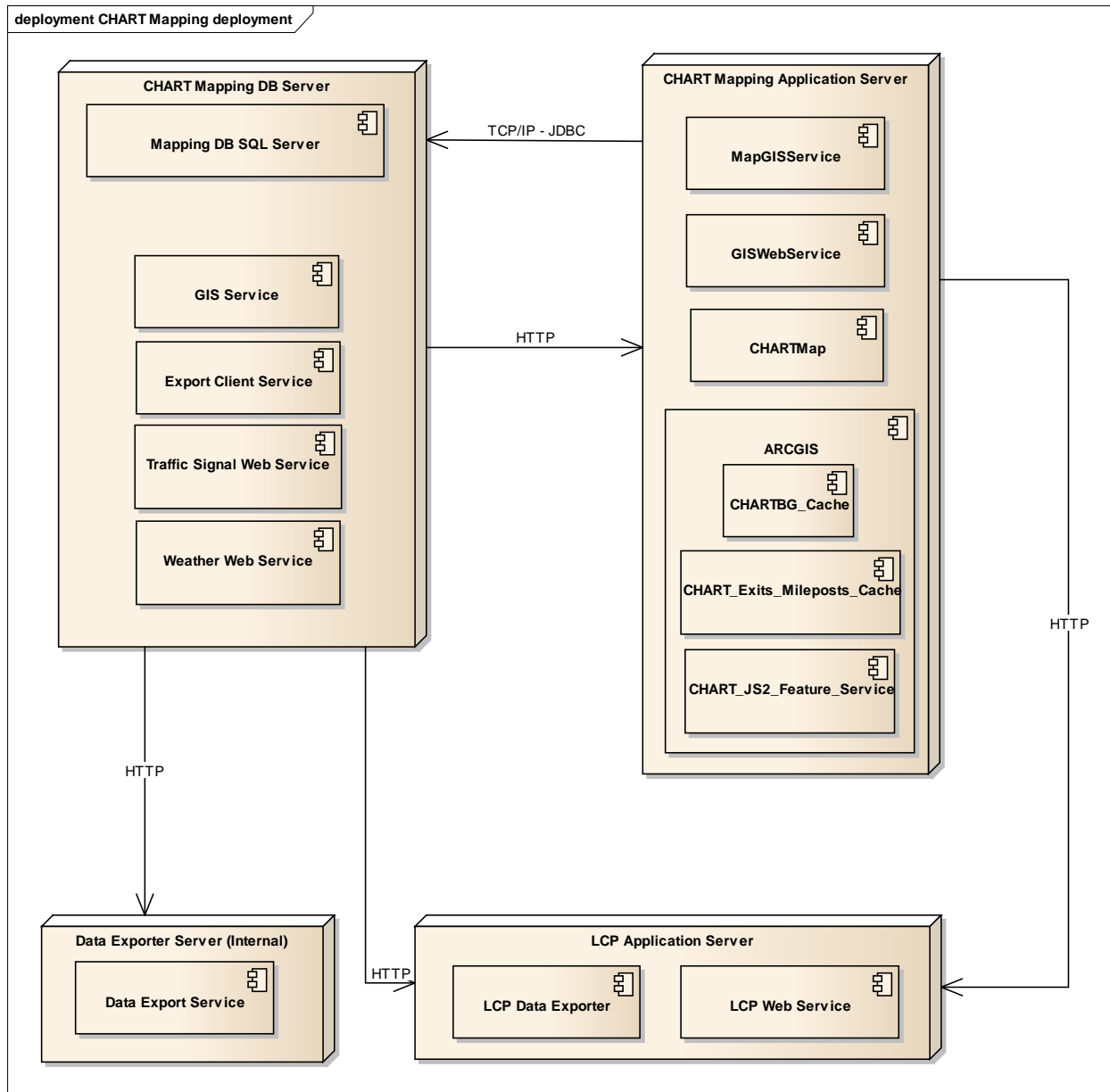


Figure 2-2 LCP/CHART Mapping Deployment Diagram

The above diagram shows the interfaces being added for CHART Mapping R15 with the following details:

- Export Client will communicate with LCP Data Exporter via HTTP/XML to retrieve initial inventory and subscribe for permit data updates. It will also communicate with the CHART Mapping Services deployed on CHART Mapping Application Server via HTTP to notify about permit changes. Permit changes include a change in the geographical location of a permit, new permits added, or any expired/deleted permits.
- CHART Mapping R15 Services deployed on CHART Mapping Application Server will communicate with the LCP Data Exporter via HTTP to notify any changes to the geographical location of a permit. This includes notification of changes when they are user initiated via the map/unmap feature of the permit on the map display.

2.2.3.1 LCP Interfaces

2.2.3.1.1 External Interfaces

This section describes the external interfaces for the LCP system. The diagram below depicts an overview of these interfaces.

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Figure 2-3 LCP and External Interfaces

LCP will interface with GIS and MapGIS services using the GIS and MapGIS web service interfaces to allow LCP to get location and lane configuration information for permits. In Phase 3 the LCP Data Exporter will be added to provide an external interface for the CHART Intranet Map application.

The primary purpose of the LCP Data Exporter is to provide an external interface to LCP data. However, it is also a convenient method for controlling data to other independent CHART applications such as the Intranet map and the public web site.

For Phase 3, the Intranet Map and CHART Public Web Site will receive their LCP permit data via an Export Client application that writes the standards-based messages to the Map database.

2.3 Security

2.3.1 LCP

LCP Release 3 will require no security updates to the existing LCP web application. However, LCP Phase 3 will introduce a new Data Exporter that provides new security features for external clients.

All external systems that connect to a LCP HTTPS/XML web service to obtain data from LCP will be assigned a unique client ID and must be pre-configured in the CHART and LCP systems by an Administrator to allow access. A public/private key pair will be generated by the Administrator for each external system, with the public key being stored in the CHART and LCP systems, and the private key being provided to the external system owner for their use when connecting to the LCP system. Each request received from an external system will include the external system client ID and a digital signature created with their private key. LCP will validate all requests using the client's public key to ensure the request is from a trusted source.

There is a security aspect to the deployment of the LCP Data Exporter in a production environment:

Authentication – Before any client is allowed to request information, their identity is first verified using an authentication key. This key is provided to each client by the CHART administrator using a separate communications method. All requests and responses are encrypted using HTTP to prevent man-in-the-middle and eavesdropping attacks.

2.4 LCP Data

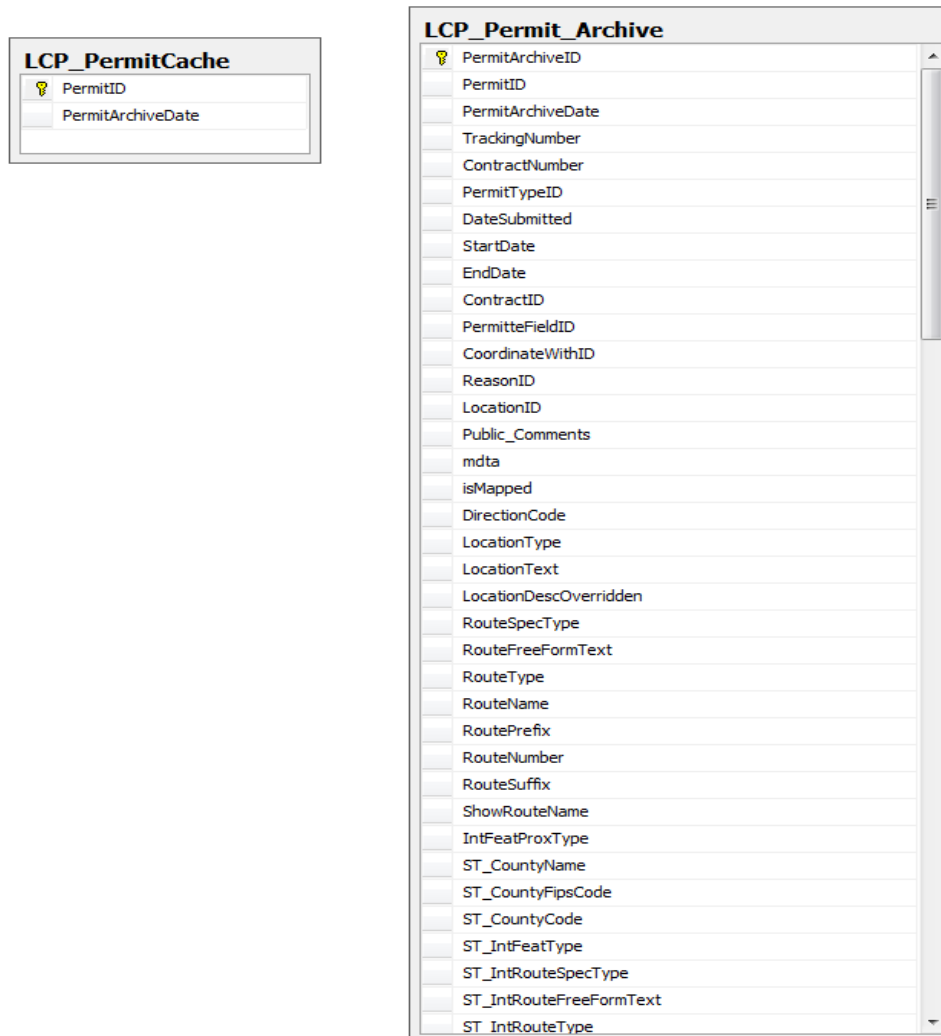
LCP Release 3 will be tested with the fielded version of Microsoft SQL Server.

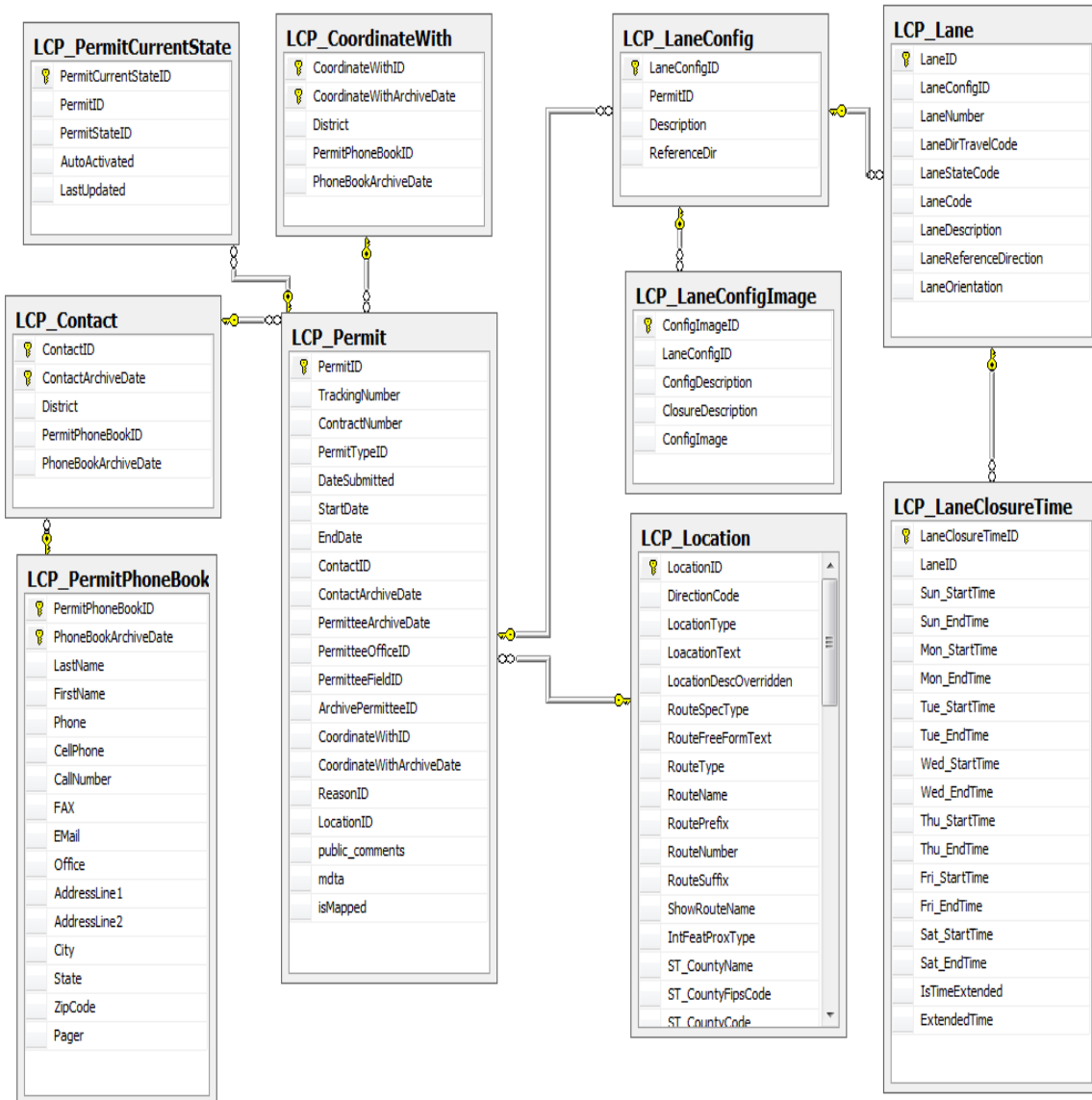
2.4.1 LCP Database

2.4.1.1 LCP Logical Design

2.4.1.1.1 LCP Entity Relationship Diagram (ERD)

LCP Phase 3 database entity relationship diagrams are shown below in the multiple pages of figures labeled collectively as one Figure. These diagrams represent the current LCP Phase 3 database design.





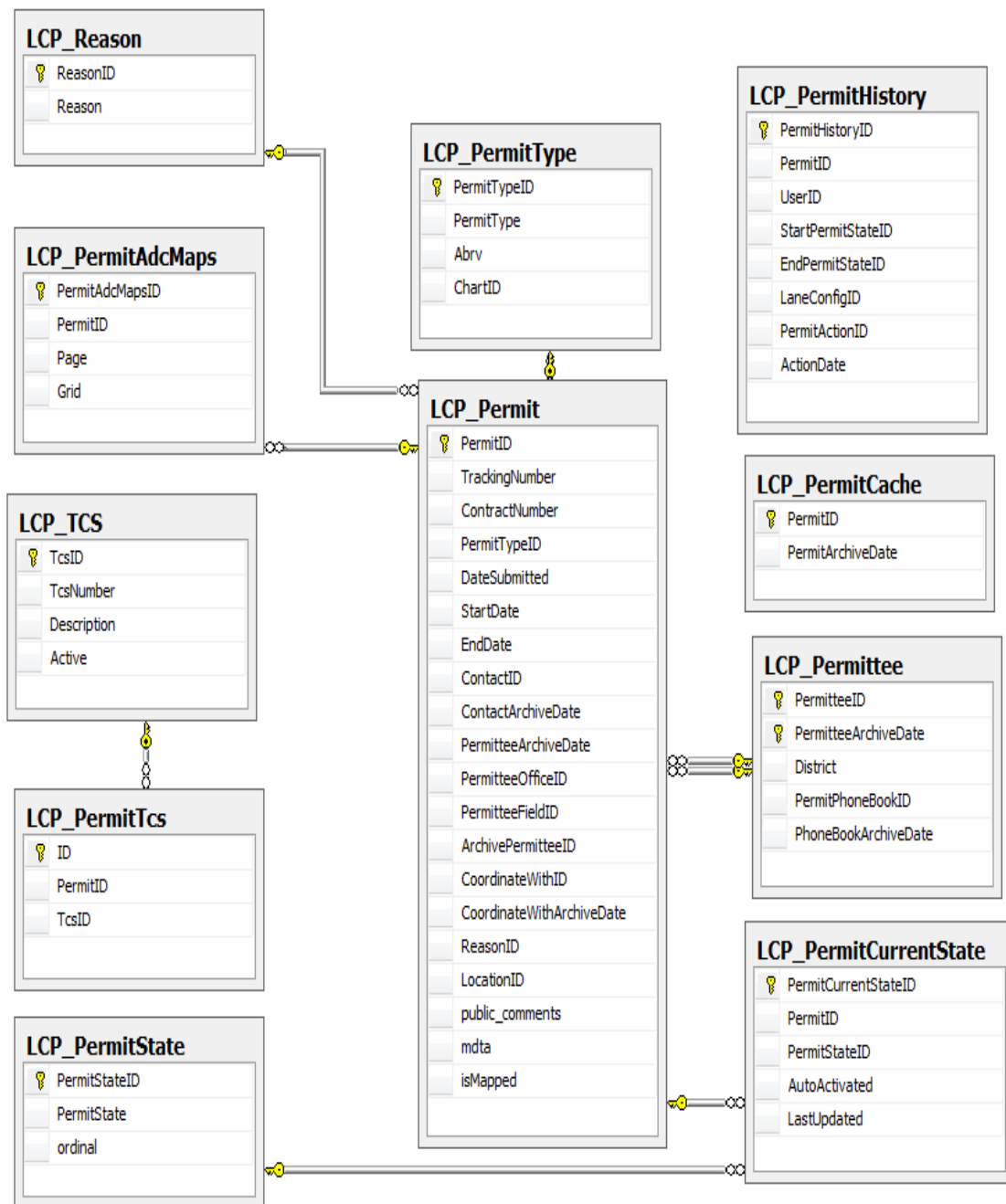


Figure 2-4 LCP Phase 3 ERD

2.4.1.2 Table Definition Report

2.4.1.2.1

LCP_Contact

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	ContactID	uniqueidentifier	True	TRUE	16	0	0		
TRUE	ContactArchiveDate	Date	True	TRUE	3	10	0		
FALSE	District	int	True	FALSE	4	10	0		
FALSE	PermitPhoneBookID	uniqueidentifier	True	FALSE	16	0	0		
FALSE	PhoneBookArchiveDate	datetime	True	FALSE	8	23	3		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes
ContactID	FK_LCP_Permit_LCP_Contact	
ContactArchiveDate	FK_LCP_Permit_LCP_Contact	

LCP_CoordinateWith

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
----	------	------	----------	--------	-----	------	-------	------	-------

TRUE	CoordinateWithID	unique identifier	True	TRUE	16	0	0		
TRUE	CoordinateWithArchiveDate	Date	True	TRUE	3	10	0		
FALSE	District	int	True	TRUE	4	10	0		
FALSE	PermitPhoneBookID	unique identifier	True	TRUE	16	0	0		
FALSE	PhoneBookArchiveDate	date	True	TRUE	8	23	3		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_Coord__Coord__0F975522	DEFAULT_CONSTRAINT	CoordinateWithID	(newid())	

Relationships

Columns	Association	Notes
ContactID	FK_LCP_Permit_LCP_Contact	
ContactArchiveDate	FK_LCP_Permit_LCP_Contact	

LCP_Lane

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	LaneID	unique identifier	TRUE	TRUE	16	0	0		
FALSE	LaneConfigID	unique identifier	TRUE	FALSE	16	0	0		
FALSE	LaneNumber	int	TRUE	FALSE	4	10	0		
FALSE	LaneDirTravelCode	int	TRUE	FALSE	4	10	0		
FALSE	LaneStateCode	int	TRUE	FALSE	4	10	0		
FALSE	LaneCode	int	TRUE	FALSE	4	10	0		
FALSE	LaneDescription	varchar	TRUE	FALSE	50	0	0		
FALSE	LaneReferenceDirection	int	TRUE	FALSE	4	10	0		
FALSE	LaneOrientation	int	TRUE	FALSE	4	10	0		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes

LCP_LaneClosureTime

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	LaneClosureTimeID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	LaneID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	Sun_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Sun_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Mon_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Mon_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Tue_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Tue_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Wed_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Wed_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Thu_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Thu_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Fri_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Fri_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Sat_StartTime	datetime	FALSE	FALSE	8	23	3		
FALSE	Sat_EndTime	datetime	FALSE	FALSE	8	23	3		
FALSE	IsTimeExtended	bit	TRUE	FALSE	1	1	0		
FALSE	ExtendedTime	datetime	FALSE	FALSE	8	23	3		

Constraints

Columns	Type	Columns	Initial Code	Notes

DF_LCP_LaneC__LaneC__1 B0907CE	DEFAULT_CONSTRAINT	LaneClosureTimeID	(newid())	
DF_LCP_LaneC__IsTim__1 BFD2C07	DEFAULT_CONSTRAINT	IsTimeExtended	((0))	

Relationships

Columns	Association	Notes

LCP_LaneConfig

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	LaneConfigID	uniquei dentifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	Description	varchar	FALSE	FALSE	250	0	0		
FALSE	ReferenceDir	int	FALSE	FALSE	4	10	0		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes
LaneConfigID	FK_LCP_Lane_LCP_LaneConfig_LaneConfig	
LaneConfigID	FK_LaneConfigImage_LCP_LaneConfig	

LCP_LaneConfigImage

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	ConfigImageID	uniquei dentifier	TRUE	TRUE	16	0	0		

FALSE	LaneConfigID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ConfigDescription	varchar	FALSE	FALSE	250	0	0		
FALSE	ClosureDescription	varchar	FALSE	FALSE	250	0	0		
FALSE	ConfigImage	varchar	FALSE	FALSE	-1	0	0		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes

LCP_Permit

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitID	uniquei dentifier	TRUE	TRUE	16	0	0		
FALSE	TrackingNumber	varchar	TRUE	FALSE	50	0	0		
FALSE	ContractNumber	varchar	FALSE	FALSE	50	0	0		
FALSE	PermitTypeID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	DateSubmitted	datetim e	TRUE	FALSE	8	23	3		
FALSE	StartDate	date	TRUE	FALSE	3	10	0		
FALSE	EndDate	date	TRUE	FALSE	3	10	0		
FALSE	ContactID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ContactArchiveDate	date	TRUE	FALSE	3	10	0		
FALSE	PermitteeArchiveDate	date	TRUE	FALSE	3	10	0		

FALSE	PermitteeOfficeID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	PermitteeFieldID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ArchivePermitteeID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	CoordinateWithID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	CoordinateWithArchiveDate	date	TRUE	FALSE	3	10	0		
FALSE	ReasonID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	LocationID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	public_comments	varchar	FALSE	FALSE	-1	0	0		
FALSE	mdta	bit	TRUE	FALSE	1	1	0		
FALSE	isMapped	bit	TRUE	FALSE	1	1	0		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes
PermitID	FK_LCP_LaneConfig_LCP_Permit	
PermitID	FK_LCP_PermitAdcMaps_LCP_Permit	
PermitID	FK_LCP_PermitCurrentState_LCP_Permit	
PermitID	FK_LCP_PermitCurrentState_LCP_Permit1	

LCP_Location

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
----	------	------	----------	--------	-----	------	-------	------	-------

TRUE	LocationID	unique identifier	TRUE	TRUE	16	0	0		
FALSE	DirectionCode	int	FALSE	FALSE	4	10	0		
FALSE	LocationType	numeric	FALSE	FALSE	5	3	0		
FALSE	LoactionText	varchar	FALSE	FALSE	1024	0	0		
FALSE	LocationDescOverridden	bit	FALSE	FALSE	1	1	0		
FALSE	RouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	RouteFreeFormText	varchar	FALSE	FALSE	255	0	0		
FALSE	RouteType	int	FALSE	FALSE	4	10	0		
FALSE	RouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	RoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	RouteNumber	varchar	FALSE	FALSE	10	0	0		
FALSE	RouteSuffix	varchar	FALSE	FALSE	10	0	0		
FALSE	ShowRouteName	bit	FALSE	FALSE	1	1	0		
FALSE	IntFeatProxType	int	FALSE	FALSE	4	10	0		
FALSE	ST_CountyName	varchar	FALSE	FALSE	50	0	0		
FALSE	ST_CountyFipsCode	char	FALSE	FALSE	3	0	0		
FALSE	ST_CountyCode	varchar	FALSE	FALSE	3	0	0		
FALSE	ST_IntFeatType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntRouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntRouteFreeFormText	varchar	FALSE	FALSE	50	0	0		
FALSE	ST_IntRouteType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntRouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	ST_IntRoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	ST_IntRouteNumber	varchar	FALSE	FALSE	10	0	0		
FALSE	ST_IntRouteSuffix	varchar	FALSE	FALSE	4	0	0		
FALSE	ST_ShowIntFeatRouteName	bit	FALSE	FALSE	1	1	0		
FALSE	ST_IntFeatMilepostType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntFeatMilliMilepostData	numeric	FALSE	FALSE	5	6	0		

FALSE	ST_IntFeatExitNumber	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntFeatExitSuffix	varchar	FALSE	FALSE	16	0	0		
FALSE	ST_IntFeatExitRouteName	varchar	FALSE	FALSE	96	0	0		
FALSE	ST_LatitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	ST_LongitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	END_CountyName	varchar	FALSE	FALSE	50	0	0		
FALSE	END_CountyFipsCode	char	FALSE	FALSE	3	0	0		
FALSE	END_CountyCode	varchar	FALSE	FALSE	3	0	0		
FALSE	END_IntFeatType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteFreeFormText	varchar	FALSE	FALSE	50	0	0		
FALSE	END_IntRouteType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	END_IntRoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	END_IntRouteNumber	varchar	FALSE	FALSE	10	0	0		
FALSE	END_IntRouteSuffix	varchar	FALSE	FALSE	4	0	0		
FALSE	END_IntFeatMilepostType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntFeatMilliMilepostData	numeric	FALSE	FALSE	5	6	0		
FALSE	END_IntFeatExitNumber	int	FALSE	FALSE	4	10	0		
FALSE	END_IntFeatExitSuffix	varchar	FALSE	FALSE	16	0	0		
FALSE	END_IntFeatExitRouteName	varchar	FALSE	FALSE	96	0	0		
FALSE	END_ShowIntFeatRouteName	bit	FALSE	FALSE	1	1	0		
FALSE	END_LatitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	END_LongitudeUdeg	decimal	FALSE	FALSE	9	16	6		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes
LocationID	FK_LCP_Permit_LCP_Location	

LCP_Permit_Archive

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitArchiveID	uniquei dentifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	PermitArchiveDate	date	TRUE	FALSE	3	10	0		
FALSE	TrackingNumber	varchar	TRUE	FALSE	50	0	0		
FALSE	ContractNumber	varchar	FALSE	FALSE	50	0	0		
FALSE	PermitTypeID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	DateSubmitted	datetim e	TRUE	FALSE	8	23	3		
FALSE	StartDate	datetim e	TRUE	FALSE	8	23	3		
FALSE	EndDate	datetim e	TRUE	FALSE	8	23	3		
FALSE	ContractID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	PermitteFieldID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	CoordinateWithID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ReasonID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	LocationID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	Public_Comments	varchar	FALSE	FALSE	-1	0	0		
FALSE	mdta	bit	TRUE	FALSE	1	1	0		
FALSE	isMapped	bit	TRUE	FALSE	1	1	0		

FALSE	DirectionCode	int	FALSE	FALSE	4	10	0		
FALSE	LocationType	numeric	FALSE	FALSE	5	3	0		
FALSE	LocationText	varchar	FALSE	FALSE	1024	0	0		
FALSE	LocationDescOverridden	bit	FALSE	FALSE	1	1	0		
FALSE	RouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	RouteFreeFormText	varchar	FALSE	FALSE	255	0	0		
FALSE	RouteType	int	FALSE	FALSE	4	10	0		
FALSE	RouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	RoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	RouteNumber	varchar	FALSE	FALSE	10	0	0		
FALSE	RouteSuffix	varchar	FALSE	FALSE	10	0	0		
FALSE	ShowRouteName	bit	FALSE	FALSE	1	1	0		
FALSE	IntFeatProxType	int	FALSE	FALSE	4	10	0		
FALSE	ST_CountyName	varchar	FALSE	FALSE	50	0	0		
FALSE	ST_CountyFipsCode	char	FALSE	FALSE	3	0	0		
FALSE	ST_CountyCode	varchar	FALSE	FALSE	3	0	0		
FALSE	ST_IntFeatType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntRouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntRouteFreeFormText	varchar	FALSE	FALSE	50	0	0		
FALSE	ST_IntRouteType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntRouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	ST_IntRoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	ST_IntRouteNumber	varchar	FALSE	FALSE	10	0	0		
FALSE	ST_IntRouteSuffix	varchar	FALSE	FALSE	4	0	0		
FALSE	ST_ShowIntFeatRouteName	bit	FALSE	FALSE	1	1	0		
FALSE	ST_IntFeatMilepostType	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntFeatMilliMilepostData	numeric	FALSE	FALSE	5	6	0		

FALSE	ST_IntFeatExitNumber	int	FALSE	FALSE	4	10	0		
FALSE	ST_IntFeatExitSuffix	varchar	FALSE	FALSE	16	0	0		
FALSE	ST_IntFeatExitRouteName	varchar	FALSE	FALSE	96	0	0		
FALSE	ST_LatitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	ST_LongitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	END_CountyName	varchar	FALSE	FALSE	50	0	0		
FALSE	END_CountyFipsCode	char	FALSE	FALSE	3	0	0		
FALSE	END_CountyCode	char	FALSE	FALSE	3	0	0		
FALSE	END_IntFeatType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteFreeFormText	varchar	FALSE	FALSE	50	0	0		
FALSE	END_IntRouteType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	END_IntRoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	ST_IntFeatExitRouteName	varchar	FALSE	FALSE	96	0	0		
FALSE	ST_LatitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	ST_LongitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	END_CountyName	varchar	FALSE	FALSE	50	0	0		
FALSE	END_CountyFipsCode	char	FALSE	FALSE	3	0	0		
FALSE	END_CountyCode	char	FALSE	FALSE	3	0	0		
FALSE	END_IntFeatType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteSpecType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteFreeFormText	varchar	FALSE	FALSE	50	0	0		
FALSE	END_IntRouteType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntRouteName	varchar	FALSE	FALSE	50	0	0		
FALSE	END_IntRoutePrefix	varchar	FALSE	FALSE	10	0	0		
FALSE	END_IntRouteNumber	varchar	FALSE	FALSE	10	0	0		

FALSE	END_IntRouteSuffix	varchar	FALSE	FALSE	4	0	0		
FALSE	END_IntFeatMilepostType	int	FALSE	FALSE	4	10	0		
FALSE	END_IntFeatMilliMilepostData	numeric	FALSE	FALSE	5	6	0		
FALSE	END_IntFeatExitNumber	int	FALSE	FALSE	4	10	0		
FALSE	END_IntFeatExitSuffix	varchar	FALSE	FALSE	16	0	0		
FALSE	END_IntFeatExitRouteName	varchar	FALSE	FALSE	96	0	0		
FALSE	END_ShowIntFeatRouteName	bit	FALSE	FALSE	1	1	0		
FALSE	END_LatitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	END_LongitudeUdeg	decimal	FALSE	FALSE	9	16	6		
FALSE	LaneID	uniqueidentifier	TRUE	FALSE	16	0	0		
FALSE	LaneNumber	int	TRUE	FALSE	4	10	0		
FALSE	LaneDirTravelCode	int	TRUE	FALSE	4	10	0		
FALSE	LaneStateCode	int	TRUE	FALSE	4	10	0		
FALSE	LaneDescription	varchar	TRUE	FALSE	50	0	0		
FALSE	LaneReferenceDirection	int	TRUE	FALSE	4	10	0		
FALSE	LaneOrientation	int	TRUE	FALSE	4	10	0		
FALSE	ConfigImageID	uniqueidentifier	TRUE	FALSE	16	0	0		
FALSE	LaneConfigID	uniqueidentifier	TRUE	FALSE	16	0	0		
FALSE	ConfigDescription	varchar	FALSE	FALSE	250	0	0		
FALSE	ClosureDescription	varchar	FALSE	FALSE	250	0	0		
FALSE	ConfigImage	varchar	FALSE	FALSE	-1	0	0		
FALSE	Description	varchar	FALSE	FALSE	250	0	0		
FALSE	ReferenceDir	int	FALSE	FALSE	4	10	0		
FALSE	District	int	TRUE	FALSE	4	10	0		
FALSE	PermitPhoneBookID	uniqueidentifier	TRUE	FALSE	16	0	0		
FALSE	PermitHistoryID	uniqueidentifier	TRUE	FALSE	16	0	0		
FALSE	UserID	uniqueidentifier	TRUE	FALSE	16	0	0		

FALSE	StartPermitStateID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	EndPermitStateID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	PermitActionID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ActionDate	datetim e	TRUE	FALSE	8	23	3		
FALSE	PermitType	varchar	TRUE	FALSE	50	0	0		
FALSE	Abrv	varchar	TRUE	FALSE	5	0	0		
FALSE	ChartID	int	FALSE	FALSE	4	10	0		
FALSE	LastName	varchar	FALSE	FALSE	50	0	0		
FALSE	FirstName	varchar	FALSE	FALSE	50	0	0		
FALSE	Phone	varchar	FALSE	FALSE	50	0	0		
FALSE	CellPhone	varchar	FALSE	FALSE	50	0	0		
FALSE	CallNumber	varchar	FALSE	FALSE	50	0	0		
FALSE	FAX	varchar	FALSE	FALSE	50	0	0		
FALSE	EMail	varchar	FALSE	FALSE	255	0	0		
FALSE	Office	varchar	FALSE	FALSE	255	0	0		
FALSE	AddressLine1	varchar	FALSE	FALSE	255	0	0		
FALSE	AddressLine2	varchar	FALSE	FALSE	255	0	0		
FALSE	City	varchar	FALSE	FALSE	50	0	0		
FALSE	State	varchar	TRUE	FALSE	50	0	0		
FALSE	ZipCode	varchar	FALSE	FALSE	10	0	0		
FALSE	Pager	varchar	FALSE	FALSE	50	0	0		
FALSE	PermitCurrentState ID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	PermitStateID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	AutoActivated	bit	TRUE	FALSE	1	1	0		
FALSE	LastUpdated	datetim e	TRUE	FALSE	8	23	3		
FALSE	PermitState	varchar	TRUE	FALSE	50	0	0		
FALSE	ordinal	int	FALSE	FALSE	4	10	0		

FALSE	PermitAdcMapsID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	Page	varchar	TRUE	FALSE	50	0	0		
FALSE	Grid	varchar	TRUE	FALSE	50	0	0		
FALSE	ContactArchiveID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ContactID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	ID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	TcsID	uniquei dentifier	TRUE	FALSE	16	0	0		
FALSE	TcsNumber	varchar	TRUE	FALSE	50	0	0		
FALSE	TCS_Description	varchar	TRUE	FALSE	250	0	0		
FALSE	Active	bit	TRUE	FALSE	1	1	0		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes

LCP_PermitAdcMaps

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Uniqu e	Len	Prec	Scale	Init	Notes
TRUE	PermitAdcMapsID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniqueid entifier	TRUE	FALSE	16	0	0		

FALSE	Page	varchar	TRUE	FALSE	50	0	0		
FALSE	Grid	varchar	TRUE	FALSE	50	0	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_Permi__Permi__403A8C7D	DEFAULT_CONSTRAINT	PermitAdcMapsID	(newid())	

Relationships

Columns	Association	Notes

LCP_PermiCache

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	PermitArchiveDate	datetime	TRUE	FALSE	8	23	3		

Constraints

Columns	Type	Columns	Initial Code	Notes
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Relationships

Columns	Association	Notes
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LCP_PermiCurrentState

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitCurrentStateID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniqueid entifier	TRUE	FALSE	16	0	0		

FALSE	PermitStateID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	AutoActivated	bit	TRUE	FALSE	1	1	0		
FALSE	LastUpdated	datetime	TRUE	FALSE	8	23	3		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_Permi__Permi__4E88ABD4	DEFAULT_CONSTRAINT	PermitCurrentStateID	(newid())	
DF__LCP_Permi__AutoA__4F7CD00D	DEFAULT_CONSTRAINT	AutoActivated	((0))	
DF__LCP_Permi__LastU__5070F446	DEFAULT_CONSTRAINT	LastUpdated	(getdate())	

Relationships

Columns	Association	Notes
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LCP_PermitHistory

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Uniqu e	Len	Prec	Scale	Init	Notes
TRUE	PermitHistoryID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	UserID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	StartPermitStateID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	EndPermitStateID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	LaneConfigID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	PermitActionID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	ActionDate	datetime	TRUE	FALSE	8	23	3		
TRUE	PermitHistoryID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniqueid entifier	TRUE	FALSE	16	0	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF_LCP_Permi__Permi__76 969D2E	DEFAULT_CONSTRAINT	PermitHistoryID	(newid())	
DF_LCP_Permi__Actio__77 8AC167	DEFAULT_CONSTRAINT	ActionDate	(getdate())	

Relationships

Columns	Association	Notes
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LCP_PermiPhoneBook

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitPhoneBookID	uniqueidentifier	TRUE	TRUE	16	0	0		
TRUE	PhoneBookArchiveDate	datetime	TRUE	TRUE	8	23	3		
FALSE	LastName	varchar	FALSE	FALSE	50	0	0		
FALSE	FirstName	varchar	FALSE	FALSE	50	0	0		
FALSE	Phone	varchar	FALSE	FALSE	50	0	0		
FALSE	CellPhone	varchar	FALSE	FALSE	50	0	0		
FALSE	CallNumber	varchar	FALSE	FALSE	50	0	0		
FALSE	FAX	varchar	FALSE	FALSE	50	0	0		
FALSE	EMail	varchar	FALSE	FALSE	255	0	0		
FALSE	Office	varchar	FALSE	FALSE	255	0	0		
FALSE	AddressLine1	varchar	FALSE	FALSE	255	0	0		
FALSE	AddressLine2	varchar	FALSE	FALSE	255	0	0		
FALSE	City	varchar	FALSE	FALSE	50	0	0		
FALSE	State	varchar	TRUE	FALSE	50	0	0		
FALSE	ZipCode	varchar	FALSE	FALSE	10	0	0		
FALSE	Pager	varchar	FALSE	FALSE	50	0	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
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Relationships

Columns	Association	Notes
PermitPhoneBookID	FK_LCP_Contact_LCP_PermiPhoneBook	
PhoneBookArchiveDate	FK_LCP_Contact_LCP_PermiPhoneBook	

PermitPhoneBookID	FK_LCP_Permittee_LCP_PermitPhoneBook	
PhoneBookArchiveDate	FK_LCP_Permittee_LCP_PermitPhoneBook	

LCP_PermitState

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitStateID	uniqueidentifier	TRUE	TRUE	16	0	0		
FALSE	PermitState	varchar	TRUE	FALSE	50	0	0		
FALSE	ordinal	int	FALSE	FALSE	4	10	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_Permi__Permi__4AB81AF0	DEFAULT_CONSTRAINT	PermitStateID	(newid())	

Relationships

Columns	Association	Notes
PermitStateID	FK_LCP_PermitCurrentState_LCP_PermitState_PermitStateID	

LCP_PermitTcs

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	ID	uniqueidentifier	TRUE	TRUE	16	0	0		
FALSE	PermitID	uniqueidentifier	TRUE	FALSE	16	0	0		
FALSE	TcsID	uniqueidentifier	TRUE	FALSE	16	0	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
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Relationships

Columns	Association	Notes

LCP_Permittee

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	PermitteeID	uniqueid entifier	TRUE	TRUE	16	0	0		
TRUE	PermitteeArchiveDate	date	TRUE	TRUE	3	10	0		
FALSE	District	int	TRUE	FALSE	4	10	0		
FALSE	PermitPhoneBookID	uniqueid entifier	TRUE	FALSE	16	0	0		
FALSE	PhoneBookArchive Date	datetime	TRUE	FALSE	8	23	3		

Constraints

Columns	Type	Columns	Initial Code	Notes

Relationships

Columns	Association	Notes
PermitteeArchiveDate	FK_LCP_Permit_LCP_Permittee	
PermitteeID	FK_LCP_Permit_LCP_Permittee	

LCP_PermitType

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
----	------	------	----------	--------	-----	------	-------	------	-------

TRUE	PermitTypeID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	PermitType	varchar	TRUE	FALSE	50	0	0		
FALSE	Abrv	varchar	TRUE	FALSE	5	0	0		
FALSE	ChartID	int	FALSE	FALSE	4	10	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_Permi__Permi__5 DCAEF64	DEFAULT_CONSTRAINT	PermitTypeID	(newid())	

Relationships

Columns	Association	Notes
PermitTypeID	FK_LCP_Permit_LCP_PermitType	

LCP_Reason

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Uniqu e	Len	Prec	Scale	Init	Notes
TRUE	ReasonID	uniqueid entifier	TRUE	TRUE	16	0	0		
FALSE	Reason	varchar	TRUE	FALSE	50	0	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_Reaso__Reaso__60 A75C0F	DEFAULT_CONSTRAINT	ReasonID	(newid())	

Relationships

Columns	Association	Notes
ReasonID	FK_LCP_Permit_LCP_Reason	

LCP_TCS

Database: SQL Server 2008, Stereotype: «table»

Detail: Created on 8/26/2014. Last modified on 8/26/2014.

Notes:

Columns

PK	Name	Type	Not Null	Unique	Len	Prec	Scale	Init	Notes
TRUE	TcsID	uniqueidentifier	TRUE	TRUE	16	0	0		
FALSE	TcsNumber	varchar	TRUE	FALSE	50	0	0		
FALSE	Description	varchar	TRUE	FALSE	250	0	0		
FALSE	Active	bit	TRUE	FALSE	1	1	0		

Constraints

Columns	Type	Columns	Initial Code	Notes
DF__LCP_TCS__Active__5629CD9C	DEFAULT_CONSTRAINT	Active	((1))	

Relationships

Columns	Association	Notes
TcsID	FK_LCP_PermitTcs_LCP_TCS_TcsID	

In addition, the following table will be added to the CHARTWeb database for the export client to cache the permits.

WT_LCP_Closures

Database: SQL Server 2008, Stereotype: «table»

Columns

PK	Name	Type
TRUE	PermitID	[uniqueidentifier] NOT NULL
FALSE	TrackingNumber	[varchar](50) NOT NULL
FALSE	PermitType	[varchar](50) NOT NULL
FALSE	TCSNumber	[varchar](500) NULL
FALSE	Reason	[varchar](50) NULL,
FALSE	DateSubmitted	[datetime] NOT NULL
FALSE	ContactName	[varchar](max) NULL
FALSE	PermitteeOfficeName	[varchar](max) NULL
FALSE	PermitteeFieldName	[varchar](max) NULL
FALSE	CoordinateWithName	[varchar](max) NULL
FALSE	ApprovalName	[varchar](max) NULL
FALSE	ApprovalDate	[datetime] NULL
FALSE	ST_CountyName	[varchar](75) NULL
FALSE	End_CountyName	[varchar](75) NULL
FALSE	RoutePrefix	[varchar](10) NULL
FALSE	RouteNumber	[varchar](10) NULL
FALSE	RouteName	[varchar](50) NULL
FALSE	RouteFreeFormText	[varchar](255) NULL
FALSE	RouteType	[int] NOT NULL
FALSE	StartDate	[datetime] NULL
FALSE	EndDate	[datetime] NULL
FALSE	Remarks	[varchar](max) NULL
FALSE	PermitStatus	[varchar](50) NOT NULL
FALSE	LocationText	[varchar](1024) NULL
FALSE	ST_LatitudeUdeg	[decimal](16, 6) NULL
FALSE	ST_LongitudeUdeg	[decimal](16, 6) NULL
FALSE	END_LatitudeUdeg	[decimal](16, 6) NULL
FALSE	END_LongitudeUdeg	[decimal](16, 6) NULL
FALSE	time_from	[varchar](8) NULL
FALSE	time_to	[varchar](8) NULL
FALSE	direction	[varchar](50) NULL
FALSE	ClosureDescription	[varchar](250) NULL
FALSE	ConfigDescription	[varchar](250) NULL
FALSE	ConfigImage	[varchar](max) NULL
FALSE	days_closed	[varchar](max) NULL
FALSE	PublicComments	[varchar](max) NULL
FALSE	MappingCounty	[varchar](2) NULL
FALSE	IsTimeExtended	[bit] NOT NULL
FALSE	active	[bit] NOT NULL
FALSE	mdshaDistrictNum	[int] NULL
FALSE	ExtendedTime	[int] NULL
FALSE	lastUpdateTime	[datetime] NULL

3 Key Design Concepts

3.1 LCP

The LCP Phase 3 application will contain a standard n-tier Model-View-Controller architecture to separate the presentation of information from the user's interaction with it. The model consists of application data and business rules, and the controller mediates input, converting it to commands for the model or view.

In addition to dividing the application into three kinds of components, the MVC design defines the interactions between them.

A **controller** can send commands to its associated view to change the view's presentation of the model (e.g., by scrolling through a document). It can send commands to the model to update the model's state (e.g., editing a document).

A **model** notifies its associated views and controllers when there has been a change in its state. This notification allows the views to produce updated output, and the controllers to change the available set of commands. A *passive* implementation of MVC omits these notifications, because the application does not require them or the software platform does not support them.

A **view** requests from the model the information that it needs to generate an output representation.

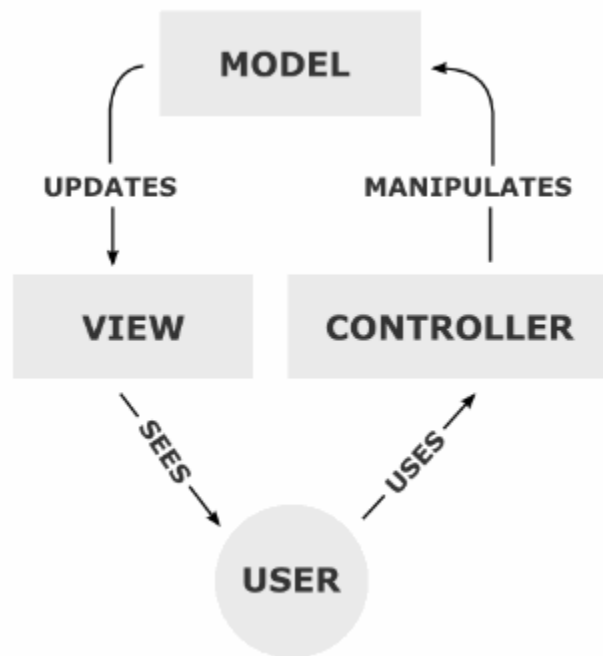


Figure 3-1 Model-View-Controller

3.2 Permit Archive/Server Jobs

LCP Phase 3 will implement a permit data archive that will reside within the overall LCP application. This archive will provide the ability to separate permits into two categories. The first category will be those permits that are currently needed for day to day operations. These include any permit that has not expired. The second category consists of the permits that have been expired for a short amount of time and are no longer needed for day to day operations. These expired permits will be classified as “archived” and will be moved into database tables using a scheduled Sql Server Agent Job. The Sql Server Agent Job will be run daily and any permits that are in the expired state and more than sixty days would be moved into the Archive database. This functionality will reduce the number of permit records that need to be traversed by the application during daily use by district and SOC operational staff. The archived permit data is still useful for historical purposes so the application will also provide the ability to search the archived permits, copy them into new permits and print permit details when needed.

3.3 Search Permits

The Search Permits module will consist of a view that can be toggled between searching for permits by tracking number only in searching for permits using all of the search filters. Searching for permits by tracking number will be accomplished by using a tracking number auto-complete textbox. By typing a portion of a tracking number in the auto-complete textbox, a user may quickly find the tracking number of a desired permit. When the auto-complete textbox is updated, the details of the matching permit will be displayed on the page. A tracking number for an archived permit will never be included in the tracking number auto-complete textbox.

The list of permit tracking numbers will be maintained in a cache to facilitate a quick lookup. The cache will be refreshed periodically with the permits in the LCP_Permits table. The cache will also be updated whenever a permit is added or deleted from the GUI. Additionally, a SQL dependency will be used to update the cache when permits that have been expired for more than 60 days are moved to the archive.

A user can also search for permits using all of the search filters (e.g. District, County, Route Type, Route Number, Permit Type, Tracking Number, Contract Number, Dates, and Times) with the results displayed in a table. The table of permit results will include the following fields: Permit Status, Tracking Number, Dates, Times, Route, and Location.

The default search filters will include the following:

- District: This will default to the user’s primary district, and
- Permit State: All of the following permit states will be selected by default: Active, Approved, Queued, Pending, Deleted, Rejected, and Expired.

Archived permits will not be included in the all filters search by default. For each row in the table of permit results, the user will be able to access a menu with options to: view the details of a permit, copy a permit, delete a permit, or update the status of a permit.

3.4 LCP Data Exporter

A web services interface will be provided by LCP to allow the CHART Intranet Map to retrieve permit data and to subscribe to updates to this data. The interface will also allow the CHART Intranet Map to pass data to LCP for when location of the permit changed. The CHART Intranet Map will include a web services interface that allows LCP to call back into the CHART Intranet Map to provide updates to permit data. For example, LCP will notify the CHART Intranet Map when a permit becomes active, inactive, expired, or updated. Details regarding this interface are included in a separate interface control document (ICD).

3.4.1 Integration Examples

Following are some example scenarios that show the integration between the CHART Intranet Map and LCP.

3.4.1.1 Get Permit Data

The following diagram is an example of the integration between the CHART Intranet Map system and LCP. The diagram depicts how the CHART Intranet Map will retrieve LCP permit data so it can be displayed in the the CHART Intranet Map system, and how the CHART Intranet Map will utilize the LCP Data Exporters interface to keep its cached permit data up to date.

Figure 3-2 Integration Example: Get Permit Data

When the the CHART Intranet Map web service starts, it will call the LCP Data Exporter and obtain a list of current permits from the LCP system. It will also send a subscription request to the LCP application, providing a callback URL that LCP will call with data updates. As data is updated in LCP, the updated data is passed to the CHART Intranet Map by making a web service request to its callback URL. Map will update its cached permit data based on these callbacks. Periodically, the CHART Intranet Map must renew its subscription so LCP knows it is still interested in receiving updates. The CHART Intranet Map will also periodically retrieve all permit data in case an update is missed for some reason. When the the CHART Intranet Map web service exits, it will call the LCP Data Exporter to cancel its subscription. If the process exits unexpectedly, LCP will eventually time out the subscription due to the lack of a subscription renewal.

3.5 PRs

3.5.1 PR 7114: LCP: Updated rules for usernames and passwords for account registration

The LCP Phase 3 implementation will require a username length to be between 4 and 32 characters for new account registration. Passwords will require 1 capital letter, 1 lower case letter, and a minimum of 8 characters and a maximum of 32 characters.

Usernames must start with a letter, and not contain white space. Passwords can also contain special characters but not required by the LCP application for registration.

Updated rules for password reset and re-use

The LCP Phase 3 application will generate an easy to read password for users when recovering lost passwords and restrictions that previous passwords can not be reused has been removed.

3.5.2 PR7118: LCP: LCP export to ATMS not providing data for all permits

The LCP application will no longer provide a bit masked representation of lane configuration data to ATMS. Instead, this data will be provided as a simple text string. Changes to Chart_Permit_View will be made to send the text to ATMS.

3.6 Intranet Map Updates

CHART Mapping R15 Intranet Map changes to add the capability for the user to filter the permits by district(s) on the map is straightforward and involves no complexity. The legend is being modified to provide the additional filters by district. See the [Intranet Map](#) in HMI section 4. Filter queries will be used when querying for permits to select only the desired districts from the ArcGIS CHART Mapping R15 Rest Services.

Additional changes to the legend include removing the capability to display Closure Segments for Planned, Pending and Active lane closure permits on the Intranet Map. The Hauling Restriction Segments legend item is being moved under the Roadwork level along with Route and Area Restrictions. These changes are straightforward and require changes just to the legend structure of the map.

3.7 Export Client

CHART ATMS 13.2 complements the existing modules included in Export Client by adding a new permits module. The permits module will be the connection between the external LCP Data Exporter and the cache maintained in the CHARTWeb database. The module on startup will authenticate, subscribe and request for the full inventory of the permits. The permits will be synched in the cache while looking for changes. From there on periodic full inventory requests and subscription updates will be used to keep the cache up to date.

Export Client will also communicate with the CHART Mapping R15 Web Services to notify about any new permits, deleted/expired permits, and changes to the geographical locations of the permits. The CHART Mapping R15 Web Services will be responsible for creating the appropriate spatial objects in the ArcGIS rest services that represent the current geographical location of the permit.

3.8 Error Processing

3.8.1 LCP Error Logging

LCP Phase 3 catches errors at both the GUI and at the server. Form validation and other user errors are reported immediately back to the user via the GUI. For user entry validation, the message usually appears next to the control item in red with description for the user to take action and correct, i.e. Field is Required or Format is incorrect. The server will trap network errors, database errors, page load errors and other internal server problems. Errors trapped on the server will be logged and error messages will be returned to the user through the GUI. The message will be an error description only and will not require user action. Additionally, server errors due to network errors or internal server problems will be written to server log file and returned back to the GUI. The message will be an error description only and will not require user action.

3.8.2 Export Client Logging

Export Client will trap all network errors, database errors, xml validation errors and any other internal problems to be logged into a flat file. Enhanced logging to capture the requests/responses exchanged with external web services can also be enabled. The errors reported will require manual inspection when issues are reported.

3.8.3 CHART Mapping Services Logs

The CHART Mapping Services will trap all network errors, database errors, xml validation errors and any other internal problems to be logged into a flat file. Enhanced logging to capture the requests/responses exchanged with external web services can also be enabled. The errors reported will require manual inspection when issues are reported.

3.9 Packaging

3.9.1 LCP

The software design is broken into packages of related classes. The table below shows each package to support LCP Phase 3.

Package Name	Package Description
LCP.App	This main package will support the new Lane Closer Permit application functionality.

Package Name	Package Description
LCP.ExternalInterface.CHART	This package will support cominication to external CHART GIS and MAPGIS web services.
LCP.App.Permit	This package will contains functionality necessary to manage permits.
LCP.App.UserManagemant	This package will contains functionality necessary to manage roles, users, and to utilize user profiles.
LCP.Utility	This package will contain common utility to support Lane Closer Permit application.
LCP.WebService.Interfaces	This package will support cominication to external clients.
LCP.WebService.DataLayer	This package will contains functionality necessary to manage permits and subscription data in LCP database
LCP.WebService.App	This main package will support the new LCP Web Service functionality.

3.9.2 CHART Mapping

The software design is broken into packages of related classes. The table below shows each package to support CHART Mapping R15.

Package Name	Package Description
CHARTMap_BizLogic.EORS	This package will support communication to external LCP Data Exporter for notification on geographical location changes for permits.

3.9.3 CHART ATMS

The software design is broken into packages of related classes. The table below shows each package to support CHART ATMS 13.2.

Package Name	Package Description
CHART2.webservices. exportlistenermodule	This package is new for ATMS 13.2 and contains classes that implement the ExportClient for Lane Closure permits export.

3.10 Assumptions and Constraints

3.10.1 LCP

1. Assumption: Internet Explorer 9 and Internet Explorer 10 will be the browsers used to access LCP Phase 3.
2. Assumption: The user will have javascript enabled in their browser.

3. Assumption: The Mapping GISService will be available for LCP Phase 3 to retrieve exits and mileposts data.
4. Assumption: The CHART ATMS GIS Service will be available for LCP Phase 3 to retrieve roadway intersections.
5. Assumption: Permit location will be dependent on the CHART GIS web service returning valid proximity and exit information.

3.10.2 Permit Archive/Server Jobs

1. Assumption: Permits in the LCP application will first enter the “Expired” state according to the current application workflow. After the permit has been in the “Expired” state for 60 days then it will be eligible to be moved to the archive and will be placed in the “Archived” state. Archiving will happen once a day in a nightly database job. A permit in the “Archived” state cannot re-enter the workflow, cannot be edited and will not display on the Intranet Map. Its data fields can be copied into the form fields for creating a new permit. The user will be able to create a permit details report for archived permits.

3.10.3 Search Permits

1. Assumption: Permit search results will not be displayed on a map in this release. Permit search results will only include permits in the LCP database and will not include access to legacy permits created in the EORS Legacy application if those permits were not imported into LCP.

3.10.4 Intranet Map Updates

1. Assumption: ArcGIS REST services are available to provide spatial objects representing permits.

3.10.5 Export Client

1. Assumption: LCP Data Exporter is available for retrieving and subscribing for permit data updates.

4 Human Machine Interface

4.1 LCP

This section describes the LCP Phase 3 GUI.

4.1.1 Background Information

The LCP Phase 3 application will be used to track road work permits. To create a permit the user must provide location information including the primary route, county and start and ending points of the road work. It will also include the lanes affected, days and times of the road work, permit type, contact information for field and internal contacts and comments/remarks associated with the permit.

4.1.2 Search Permits

4.1.2.1 New Search Permits Page

For LCP Phase 3, a new Search Permits page has been added to improve performance and allow for greater flexibility when searching for permits. The new Search Permits page is accessible via the main menu (see Figure 4-1 below). On the Search Permits page, a user can search for permits either by tracking number only or by any combination of the search filters (e.g. District, County, Route Type, Route Number, Permit Type, Tracking Number, Contract Number, Dates, and Times). The results of an All Filters search (i.e. any combination of the search filters) can be filtered by permit state and can also include archived permits.

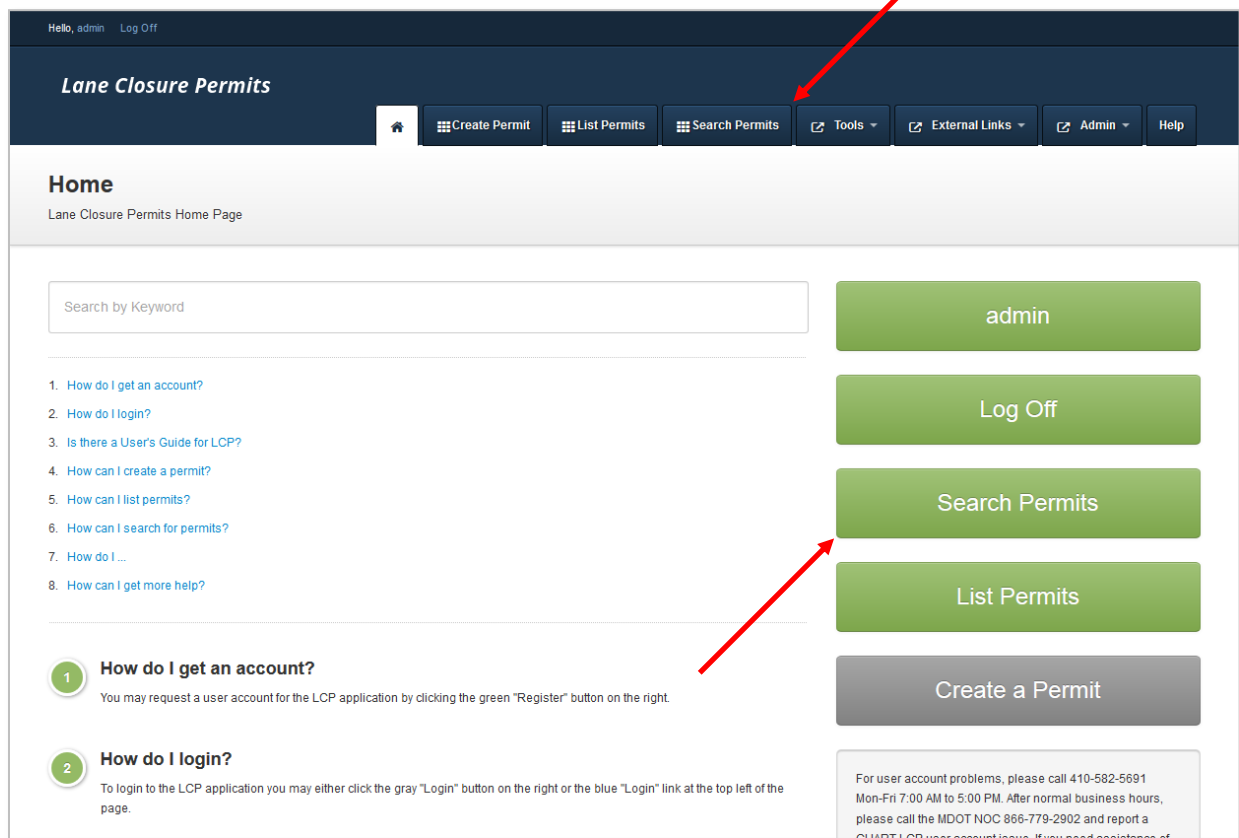
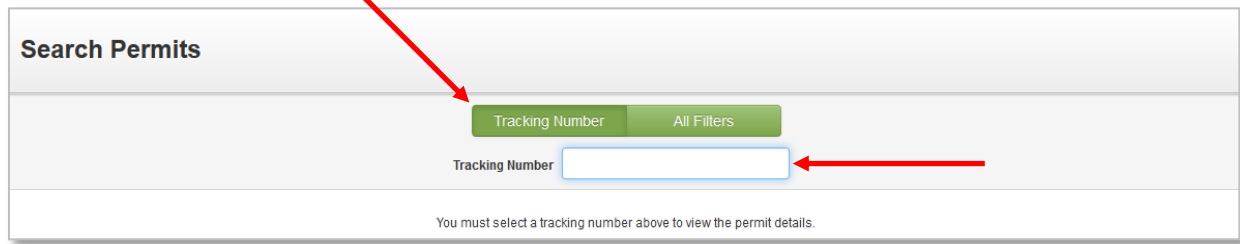


Figure 4-1 The Home Page Showing the New Search Permits Menu Entry.

4.1.2.2 Searching by Tracking Number

When the new Search Permits page loads, the Tracking Number toggle button is selected by default and the tracking number auto-complete box is visible (see Figure 4-2 below). The Tracking Number search can be used to quickly find a current permit via its tracking number and view the details of the permit. Note: Archived permits are not included in the tracking number auto-complete box.



Search Permits

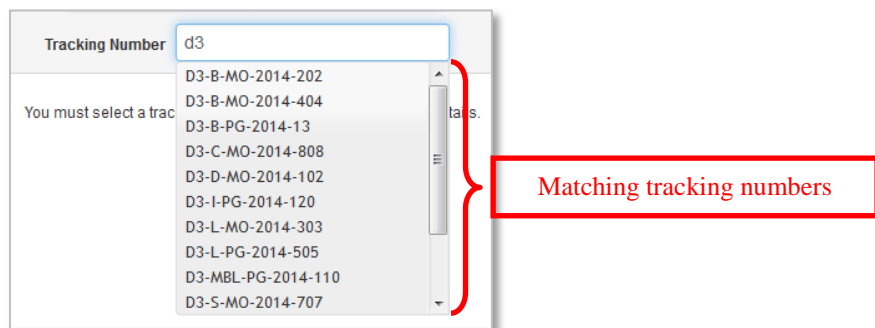
Tracking Number All Filters

Tracking Number

You must select a tracking number above to view the permit details.

Figure 4-2 The Search Permits Page Showing the Tracking Number Auto-Complete Box.

When a user enters a portion of a tracking number in the Tracking Number auto-complete box, all matching tracking numbers will be displayed (see Figure 4-3 below). If there are more than 10 tracking numbers that match, the list can be scrolled to view all of the matches.



Tracking Number d3

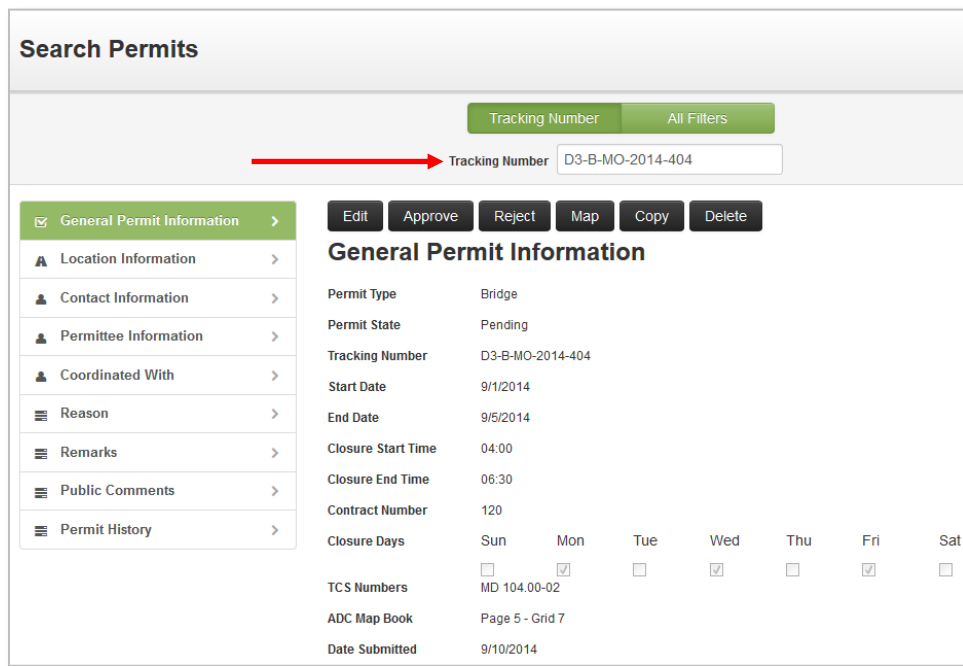
You must select a tracking number above to view the permit details.

- D3-B-MO-2014-202
- D3-B-MO-2014-404
- D3-B-PG-2014-13
- D3-C-MO-2014-808
- D3-D-MO-2014-102
- D3-I-PG-2014-120
- D3-L-MO-2014-303
- D3-L-PG-2014-505
- D3-MBL-PG-2014-110
- D3-S-MO-2014-707

Matching tracking numbers

Figure 4-3 The Tracking Number Auto-Complete Box Showing Matching Tracking Numbers.

When a tracking number is selected from the list of matching tracking numbers, the details for the corresponding permit are displayed on the Search Permits page (see Figure 4-4 below).



Search Permits

Tracking Number All Filters

Tracking Number D3-B-MO-2014-404

Edit Approve Reject Map Copy Delete

General Permit Information

Permit Type Bridge

Permit State Pending

Tracking Number D3-B-MO-2014-404

Start Date 9/1/2014

End Date 9/5/2014

Closure Start Time 04:00

Closure End Time 06:30

Contract Number 120

Closure Days Sun Mon Tue Wed Thu Fri Sat

TCS Numbers MD 104.00-02

ADC Map Book Page 5 - Grid 7

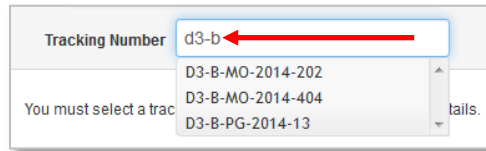
Date Submitted 9/10/2014

Figure 4-4 The Permit Search Page Showing the Details of a Permit.

4.1.2.2.1 Tracking Number Search Options

The following three approaches can be used to search for a permit using the tracking number auto-complete box:

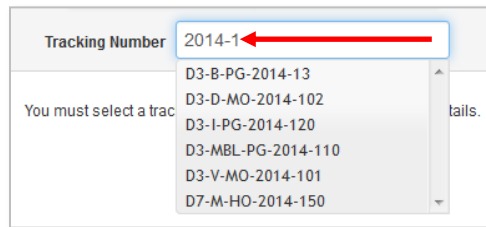
- Search by a portion of the tracking number starting with the letter D (see Figure 4-5 below).



The screenshot shows a search interface with a 'Tracking Number' label and a text input field containing 'd3-b'. A red arrow points to the input field. Below the input field is a dropdown menu with the following options: 'D3-B-MO-2014-202', 'D3-B-MO-2014-404', and 'D3-B-PG-2014-13'. To the left of the dropdown is the text 'You must select a trac', and to the right is a 'tails.' link.

Figure 4-5 Searching for a Tracking Number Starting With the Letter D.

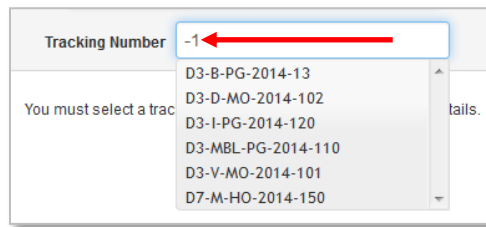
- Search by the four digit year, followed by a dash, followed by one or more numbers (see Figure 4-6 below).



The screenshot shows a search interface with a 'Tracking Number' label and a text input field containing '2014-1'. A red arrow points to the input field. Below the input field is a dropdown menu with the following options: 'D3-B-PG-2014-13', 'D3-D-MO-2014-102', 'D3-I-PG-2014-120', 'D3-MBL-PG-2014-110', 'D3-V-MO-2014-101', and 'D7-M-HO-2014-150'. To the left of the dropdown is the text 'You must select a trac', and to the right is a 'tails.' link.

Figure 4-6 Searching for a Tracking Number by the Four-Digit Year.

- Search by a dash followed by one or more numbers (see Figure 4-7 below).



The screenshot shows a search interface with a 'Tracking Number' label and a text input field containing '-1'. A red arrow points to the input field. Below the input field is a dropdown menu with the following options: 'D3-B-PG-2014-13', 'D3-D-MO-2014-102', 'D3-I-PG-2014-120', 'D3-MBL-PG-2014-110', 'D3-V-MO-2014-101', and 'D7-M-HO-2014-150'. To the left of the dropdown is the text 'You must select a trac', and to the right is a 'tails.' link.

Figure 4-7 Searching for a Tracking Number by the Digits Following the Year.

4.1.2.3 Searching by All Filters

The All Filters search can be accessed by clicking on the All Filters toggle button at the top of the new Search Permits page (see Figure 4-8 below). The All Filters search is similar to the List Permits page except that it allows more flexibility and can include archived permits in the results. The All Filters search includes checkboxes that allow the results to be filtered based on the state of the permit (i.e. Active, Approved, Queued, Pending, Deleted, Rejected, and Expired). The permit state is also visible in the Permits table in the first column. The Permit State column in the table can be sorted just like all other columns of the table (except for the Actions column). A checkbox has also been added to indicate that the search should include archived permits. In addition, Search and Reset buttons have been added to the page. After specifying the filter criteria, you must click on the Search button to see the results. Clicking on the Reset button will reset all the filters to their default values, as well as clear the results in the permits table.

Search Permits

Tracking Number All Filters

District: District 3 County: -All-

Route Type: -All- Route Number: -All-

Permit Type: -All- Tracking Number: Contract Number:

By: ☒ Date ☐ Date Range Date: By Time: ☒ All ☐ AM ☐ PM

☒ Active ☒ Approved ☒ Queued ☒ Pending ☒ Deleted ☒ Rejected ☒ Expired

☐ Include Archived Permits

Search Reset

Hide Search Options ↑

Search Results

Show 10 entries

Permit State Tracking Number Dates Times Route Location

You must perform a Search to view Permit data.

Showing 0 to 0 of 0 entries

← Previous Next →

Figure 4-8 The Search Permits Page Showing the All Filters Search Options.

4.1.2.3.1 Searching for Permits

When the All Filters search first loads, the District filter will be pre-filled with the user's Primary District and all of the permit state checkboxes will be selected (i.e. Active, Approved, Queued, Pending, Deleted, Rejected, and Expired). A user can search for permits by specifying any valid combination of the available search filters (see Table 4-1 below).

Table 4-1 Filter Criteria for the List Permits Page.

Filter	Values
District	All, District 1, District 2, District 3, District 4, District 5, District 6, District 7, MDTA
County	All or a single county (based on the selected district)
Route Type	All, I, MD, US, CO, GV, MU, OP, SR, FREEFORM
Route Number	All or a single route number (based on the selected county and route type)
Permit Type	All, Bridge, Landscape, Materials & Testing, Survey, Other, Shop Maintenance, Long-term Continuous, Construction, Traffic, District Maintenance, Utility, ITS Device, Mobile
Tracking Number	User entered
Contract Number	User entered
Date	A single date
Date Range	A start date and end date
Time	All, AM, or PM

Once the filter criteria have been specified, clicking on the search button will populate the permits table with all permits that match the filter criteria (see Figure 4-9 below). The permits table contains the following columns: Permit State (this column is new in LCP Phase 3), Tracking Number, Dates (the start and end date of the permit), Times (the start and end times of the permit), Route (the primary Route), Location (the location description), and Actions (a drop-down with optional actions based upon the state of the permit).

The screenshot shows the 'Search Permits' interface. At the top, there are tabs for 'Tracking Number' and 'All Filters'. Below these are various filter fields: District (District 3), County (Montgomery County), Route Type (I), Route Number (-All-), Permit Type (-All-), Tracking Number, and Contract Number. There are also radio buttons for 'By Date', 'By Time', and 'Date Range', and checkboxes for 'Active', 'Approved', 'Queued', 'Pending', 'Deleted', 'Rejected', 'Expired', and 'Include Archived Permits'. A red arrow points to the 'Search' button, and another red arrow points to the 'Hide Search Options' button. Below the search filters, there is a 'Search Results' section with a table showing 10 entries. The table has columns for Permit State, Tracking Number, Dates, Times, Route, Location, and Actions. The first three entries are: Approved (D3-V-MO-2014-101), Deleted (D3-L-MO-2014-303), and Expired (D3-B-MO-2014-202).

Permit State	Tracking Number	Dates	Times	Route	Location	Actions
Approved	D3-V-MO-2014-101	07/28/2014 - 08/01/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH AT (CO - 81) - MUDDY BRANCH RD (I - 270) (CO - 221) - GAME PRESERVE RD (I - 270)	Options
Deleted	D3-L-MO-2014-303	08/05/2014 - 08/05/2014	09:00 - 09:30	I 370	MONTGOMERY COUNTY: I-370 EAST FROM (CO - 2944) - INDUSTRIAL DR (I - 370) TO (CO - 4215) - OAKMONT AVE (I - 370)	Options
Expired	D3-B-MO-2014-202	08/01/2014 - 08/08/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH FROM (MD - 117) - W DIAMOND AVE (I - 270) TO (MD - 124) - QUINCE ORCHARD RD (I - 270)	Options

Figure 4-9 The All Filters Search Showing the Results of a Search.

All of the columns (except the Actions column) can be sorted (either ascending or descending) by clicking on the column header. Clicking on the “Hide Search Options” button will hide the filter criteria (see Figure 4-10 below). Clicking on the “Show Search Options” button will make the filter criteria visible again. If no permits are found that match the search criteria, the following message will be displayed in the table: “No Permits were found.”

Search Permits

Tracking Number

All Filters

Show Search Options ▾

Search Results

Show 10 ▾ entries

Permit State	Tracking Number	Dates	Times	Route	Location	
Approved	D3-V-MO-2014-101	07/28/2014 - 08/01/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH AT (CO - 81) - MUDPOT BRANCH RD (I - 270) (CO - 221) - GAME PRESERVE RD (I - 270)	Options ▾
Deleted	D3-L-MO-2014-303	8/05/2014 - 08/09/2014	08:00 - 20:00	I 370	MONTGOMERY COUNTY: I-370 EAST FROM (CO - 2944) - INDUSTRIAL DR (I - 370) TO (CO - 4215) - OAKMONT AVE (I - 370)	Options ▾
Expired	D3-B-MO-2014-202	08/01/2014 - 08/08/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH FROM (MD - 117) - W DIAMOND AVE (I - 270) TO (MD - 124) - QUINCE ORCHARD RD (I - 270)	Options ▾
Pending	D3-B-MO-2014-404	09/01/2014 - 09/05/2014	04:00 - 06:30	I 270	MONTGOMERY COUNTY: I-270 NORTH FROM (MD - 109) - OLD HUNDRED RD (I - 270) TO (CO - 164) - TUCKERMAN LA (I - 270)	Options ▾
Queued	D3-C-MO-2014-808	08/19/2014 - 08/21/2014	07:00 - 09:00	I 370	MONTGOMERY COUNTY: I-370 WEST FROM (CO - 4215) - OAKMONT AVE (I - 370) TO STATE MILEPOST 2.01 (I - 370)	Options ▾

Showing 1 to 5 of 5 entries

← Previous

1

Next →

Figure 4-10 The All Filters Search Showing the Results of a Search With the Filter Options Hidden.

4.1.2.3.2 Viewing Permit Details

The Actions column of the permit results table contains the Options drop-down. The available options depend on the state of the permit. Regardless of the state of the permit, the first option in the drop-down is always to view the details of the permit (see Figure 4-11 below).

Search Permits

Tracking Number

All Filters

Show Search Options ↓

Search Results

Show 10 entries

Permit State	Tracking Number	Dates	Times	Route	Location	
Active	D3-I-PG-2014-120	09/01/2014 - 09/15/2014	08:00 - 05:00	I 495	PRINCE GEORGE'S COUNTY: I-495 OUTER LOOP FROM EXIT 27 - I 95(I - 495) TO (MD - 212) - RIGGS RD (I - 495)	<div>Options ▾</div> <div>Details</div> <div>Copy</div> <div>Deactivate</div>
Approved	D3-V-MO-2014-101	07/28/2014 - 08/01/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH AT (CO - 81) - MUDDY BRANCH RD (I - 270) (CO - 221) - GAME PRESERVE RD (I - 270)	
Approved	D3-MBL-PG-2014-110	07/13/2014 - 07/26/2014	12:00 - 21:15	US 50	PRINCE GEORGE'S COUNTY: US-50 EAST FROM (MD - 295) - BALTIMORE WASHINGTON PKWY (US - 50) TO EXIT 6 - GARDEN CITY DR(US - 50)	<div>Options ▾</div>
Queued	D3-C-MO-2014-808	08/19/2014 - 08/21/2014	07:00 - 09:00	I 370	MONTGOMERY COUNTY: I-370 WEST FROM (CO - 4215) - OAKMONT AVE (I - 370) TO STATE MILEPOST 2.01 (I - 370)	<div>Options ▾</div>

Showing 1 to 4 of 4 entries

← Previous

1

Next →

Figure 4-11 The All Filters Search Showing the Options Drop-Down.

New for LCP Phase 3, clicking on the Details link in the Options drop-down will cause the permit details to be displayed in the Permit Details tab (see Figure 4-12 below). A user can then click on the Search Results tab to go back to the permit results table. The current search results will still be visible so a user can view the details of multiple permits without having to perform a new search each time. When a new search is performed (or the search filters are reset), the Permit Details tab will no longer be visible.

Search Permits

Tracking Number All Filters

Show Search Options ↓

Search Results Permit Details

General Permit Information >

Location Information >

Contact Information >

Permittee Information >

Coordinated With >

Reason >

Remarks >

Public Comments >

Permit History >

Extend Deactivate Map Copy Print

General Permit Information

Permit Type ITS Device

Permit State Active

Tracking Number D3-I-PG-2014-120

Start Date 9/1/2014

End Date 9/15/2014

Closure Start Time 08:00

Closure End Time 05:00

Extended To 00:00

Contract Number 122

Closure Days Sun Mon Tue Wed Thu Fri Sat

TCS Numbers ☐ MD 104.01-30 A ☒ ☐ ☒ ☐ ☒ ☐

ADC Map Book

Date Submitted 9/11/2014

Figure 4-12 The All Filters Search Showing the Permit Details Tab.

4.1.2.3.3 Filtering Results Based on Permit State

New for LCP Phase 3, the search results can be filtered by permit state. Only the permits with a permit state matching one of the selected permit state checkboxes will appear in the results (see Figure 4-13 below).

Search Permits

Tracking Number

All Filters

District

District 3

County

-All-

Route Type

-All-

Route Number

-All-

Permit Type

-All-

Tracking Number

Contract Number

By

☒ Date

☐ Date Range

Date

By Time

☒ All

☐ AM

☐ PM

☒ Active

☒ Approved

☒ Queued

☐ Pending

☐ Deleted

☐ Rejected

☐ Expired

☐ Include Archived Permits

Search

Reset

Hide Search Options

Search Results

Show

10

entries

Permit State	Tracking Number	Dates	Times	Route	Location	
Active	D3-I-PG-2014-120	09/01/2014 - 09/15/2014	08:00 - 05:00	I 495	PRINCE GEORGE'S COUNTY: I-495 OUTER LOOP FROM EXIT 27 - I 95(I - 495) TO (MD - 212) - RIGGS RD (I - 495)	Options
Approved	D3-V-MO-2014-101	07/28/2014 - 08/01/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH AT (CO - 81) - MUDDY BRANCH RD (I - 270) (CO - 221) - GAME PRESERVE RD (I - 270)	Options
Approved	D3-MBL-PG-2014-110	07/13/2014 - 07/26/2014	12:00 - 21:15	US 50	PRINCE GEORGE'S COUNTY: US-50 EAST FROM (MD - 295) - BALTIMORE WASHINGTON PKWY (US - 50) TO EXIT 6 - GARDEN CITY DR(US - 50)	Options

Figure 4-13 The All Filters Search Showing the Results of a Search Filtered by the Permit State.

4.1.2.3.4 Searching Archived Permits

New for LCP Phase 3, permits that have been in the expired state for at least 60 days will be classified as “archived” and will be moved into database tables that are distinctly separate from those used to store current permits. A user can search for archived permits by clicking on the “Include Archived Permits” checkbox (see Figure 4-15 below). A dialog will appear when a user checks the “Include Archived Permits” checkbox asking the user to confirm that they want to include archived permits in the search (see Figure 4-14 below). The user is asked to confirm this action because including archived permits in the search may significantly increase the time it takes to perform the search.

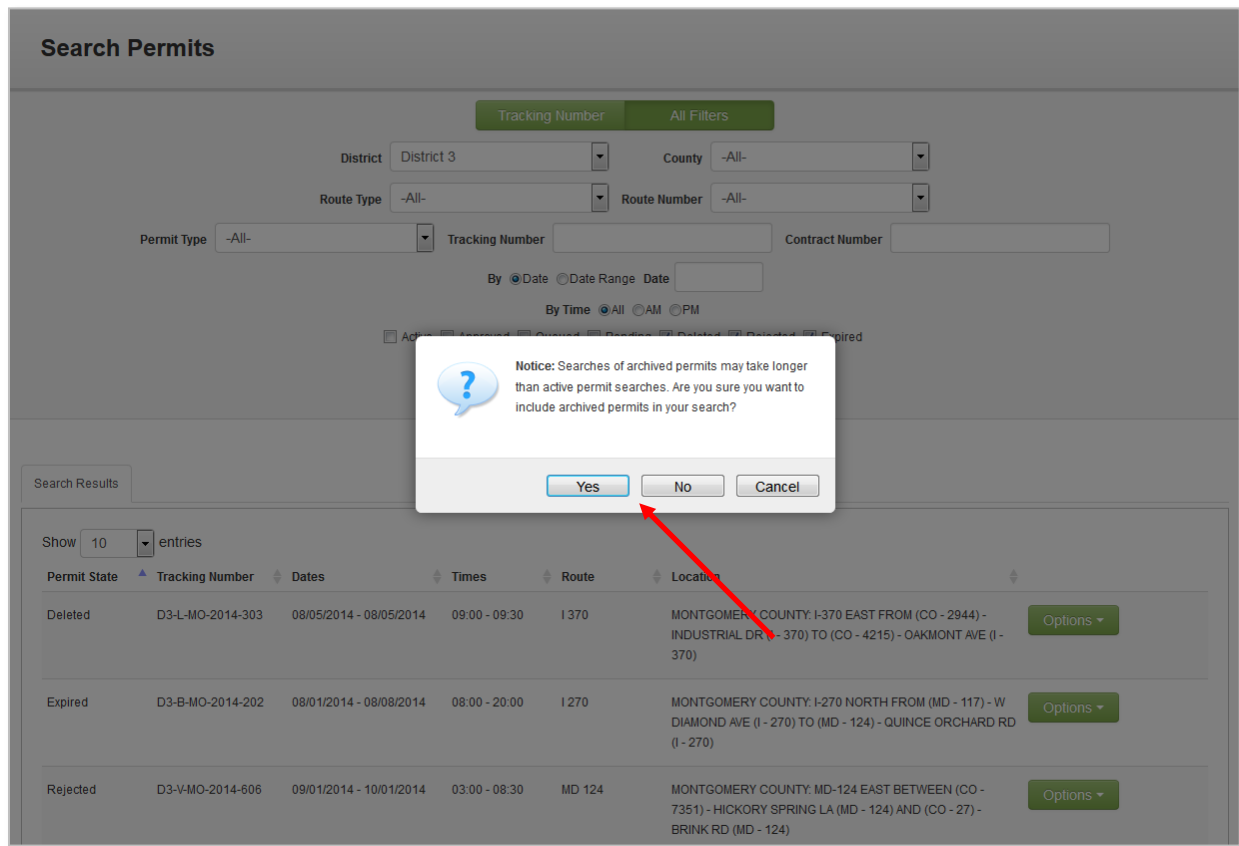


Figure 4-14 The All Filters Search Showing the Include Archived Permits Dialog.

With the “Include Archived Permits” checkbox checked, the search results will include both current and archived permits. In order to make archived permits easily identifiable, the entire row in the permits table for an archived permit will be shaded gray (see Figure 4-15 below).

Search Permits

Tracking Number

All Filters

District

District 3

County

-All-

Route Type

-All-

Route Number

-All-

Permit Type

-All-

Tracking Number

Contract Number

By

Date

Date Range

Date

By Time

All

AM

PM

Active

Approved

Queued

Pending

Deleted

Rejected

Expired

Include Archived Permits

Search

Reset

Hide Search Options

Search Results

Show

10

entries

Permit State	Tracking Number	Dates	Times	Route	Location	
Archived	D3-T-MO-2014-909	08/10/2014 - 08/16/2014	05:00 - 17:30	MD 124	MONTGOMERY COUNTY: MD-124 WEST FROM (CO - 35) - GOSHEN SCHOOL RD (MD - 124) TO (CO - 5722) - HADLEY FARMS DR (MD - 124)	Options
Deleted	D3-L-MO-2014-303	08/05/2014 - 08/05/2014	09:00 - 09:30	I 370	MONTGOMERY COUNTY: I-370 EAST FROM (CO - 2944) - INDUSTRIAL DR (I - 370) TO (CO - 4215) - OAKMONT AVE (I - 370)	Options
Expired	D3-B-MO-2014-202	08/01/2014 - 08/08/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH FROM (MD - 117) - W DIAMOND AVE (I - 270) TO (MD - 124) - QUINCE ORCHARD RD (I - 270)	Options

Figure 4-15 The All Filters Search Showing the Results of a Search That Includes Archived Permits.

A user can either view the details of the archived permit or create a copy of the archived permit that can be used as the basis of a new permit. These actions are available from the options drop-down in the actions column of the permits table (see Figure 4-16 below).

Search Permits

Tracking Number

All Filters

Show Search Options

Search Results

Show 10 entries

Permit State	Tracking Number	Dates	Times	Route	Location	
Archived	D3-T-MO-2014-909	08/10/2014 - 08/16/2014	05:00 - 17:30	MD 124	MONTGOMERY COUNTY: MD-124 WEST FROM (CO - 35) - GOSHEN SCHOOL RD (MD - 124) TO (CO - 5722) - HADLEY FARMS DR (MD - 124)	<div>Options</div> <div> <div>Details</div> <div>Copy</div> </div>
Deleted	D3-L-MO-2014-303	08/05/2014 - 08/05/2014	09:00 - 09:30	I 370	MONTGOMERY COUNTY: I-370 EAST FROM (CO - 2944) - INDUSTRIAL DR (I - 370) TO (CO - 4215) - OAKMONT AVE (I - 370)	
Expired	D3-B-MO-2014-202	08/01/2014 - 08/08/2014	08:00 - 20:00	I 270	MONTGOMERY COUNTY: I-270 NORTH FROM (MD - 117) - W DIAMOND AVE (I - 270) TO (MD - 124) - QUINCE ORCHARD RD (I - 270)	Options
Rejected	D3-V-MO-2014-606	09/01/2014 - 10/01/2014	03:00 - 08:30	MD 124	MONTGOMERY COUNTY: MD-124 EAST BETWEEN (CO - 7351) - HICKORY SPRING LA (MD - 124) AND (CO - 27) - BRINK RD (MD - 124)	Options

Showing 1 to 4 of 4 entries

Previous

1

Next

Figure 4-16 The Permits Table Showing the Options Drop-Down for an Archived Permit.

4.1.3 PRs

4.1.3.1 PR 7114: LCP: Updated rules for usernames and passwords for account registration

LCP Phase 3 will update the user registration and creations pages to provide a textual description of the updated username and password requirements. These user interfaces will also be updates with the appropriate field validation and errors messages to coincide with the updated username and password wules.

The screenshot displays the 'Register' page for 'Lane Closure Permits'. At the top, there are links for 'Register' and 'Log in'. The main heading is 'Lane Closure Permits'. Below this, the 'Register' section includes the text 'Register for an account.' A light blue box contains the requirements: 'User Name Requirements: Must start with a letter and not include spaces, and must be between 4 and 32 characters long, including letters and numbers.' and 'Password Requirements: Passwords must be between 8 and 32 characters in length. Must include at least one uppercase letter and one lowercase letter.' The 'Account Information' section contains four input fields: 'User name', 'Email', 'Password', and 'Confirm password'. The 'User name' field is highlighted with a red border and a red error message: 'The User name field is required.'

Register Log in

Lane Closure Permits

Register

Register for an account.

User Name Requirements:

- Must start with a letter and not include spaces, and must be between 4 and 32 characters long, including letters and numbers.

Password Requirements:

- Passwords must be between 8 and 32 characters in length.
- Must include at least one uppercase letter and one lowercase letter.

Account Information

User name The User name field is required.

Email

Password

Confirm password

Figure 4-17 PR7114 User Registration from the Registration page

Username must start with a letter, and not contain white space. Passwords can also contain special characters but not required by the LCP application for registration. The following figure shows the create user registration from the Admin page.

Hello, admin Log Off

Lane Closure Permits

Create Permit List Permits Tools Ex

Create User

Lane Closure Permits Create User

User Name Requirements:

- Must start with a letter and not include spaces, and must be between 4 and 32 characters long, including letters and numbers.

Password Requirements:

- Passwords must be between 8 and 32 characters in length.
- Must include at least one uppercase letter and one lowercase letter.

Enter User Credentials

User name The User name field is required.

Email

Password

Confirm password

Approve ☐

Figure 4-18 PR7114 Create User Registration from the Administration page

The screenshot shows a web browser window with the address bar displaying `http://localhost:11796/SGAccount/ForgotPassword`. The browser has two tabs: 'Lane Closure Permits - For...' and another partially visible tab. The page has a dark blue header with the text 'Lane Closure Permits' and links for 'Register' and 'Log in'. Below the header, the main content area is light gray and features the heading 'Reset Password'. A sub-header reads: 'Please enter your email address and your password will be reset and emailed to you. If you do not have yet have an account please [register for an account](#).' The form section is titled 'Reset your password' and contains an 'Email' label next to a text input field. Below the input field is a green button with a star icon and the text 'Reset Password'.

Figure 4-19 PR7114 Password Reset

4.1.4 Intranet Map

4.1.4.1 View Permits by district

CHART Mapping R15 will provide changes to the Intranet Map legend to filter the permits for display by districts. The districts available for filtering are: District 1, District 2, District 3, District 4, District 5, District 6, District 7, and MDTA (Maryland Transportation Authority). The permits on the map display will only show for the user selected districts as shown in the figure below. Clustering if enabled will still apply for Planned Closures display.

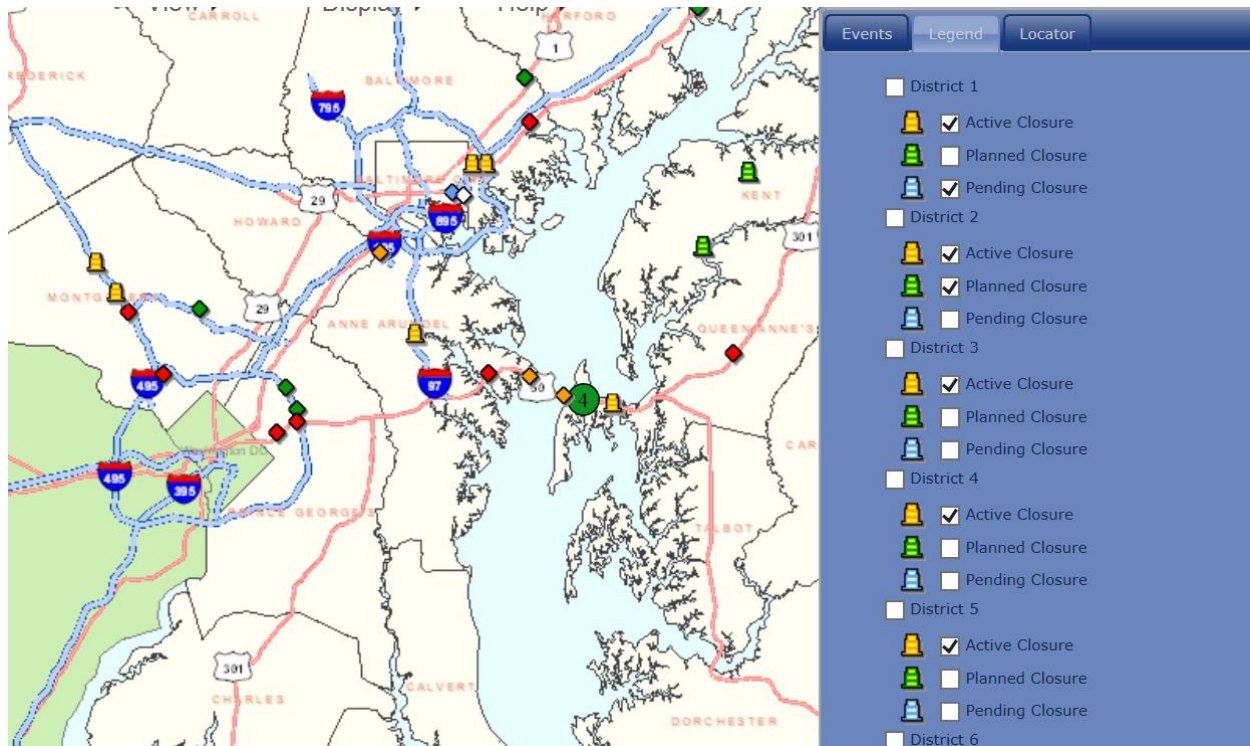
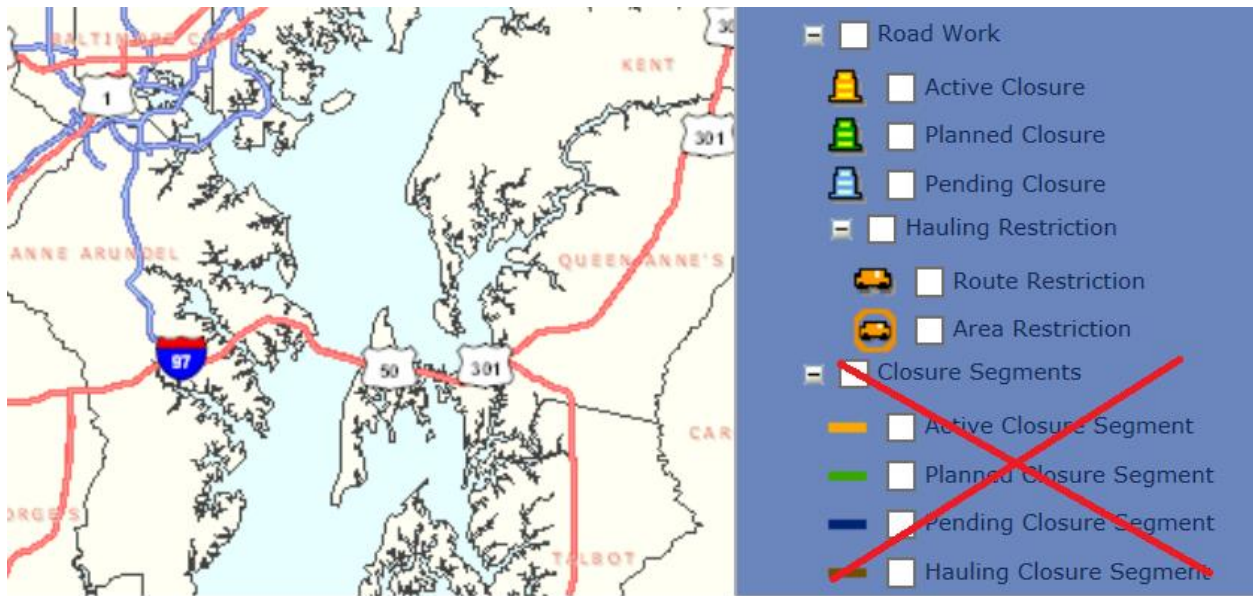


Figure 4-20 Intranet Map District Filter

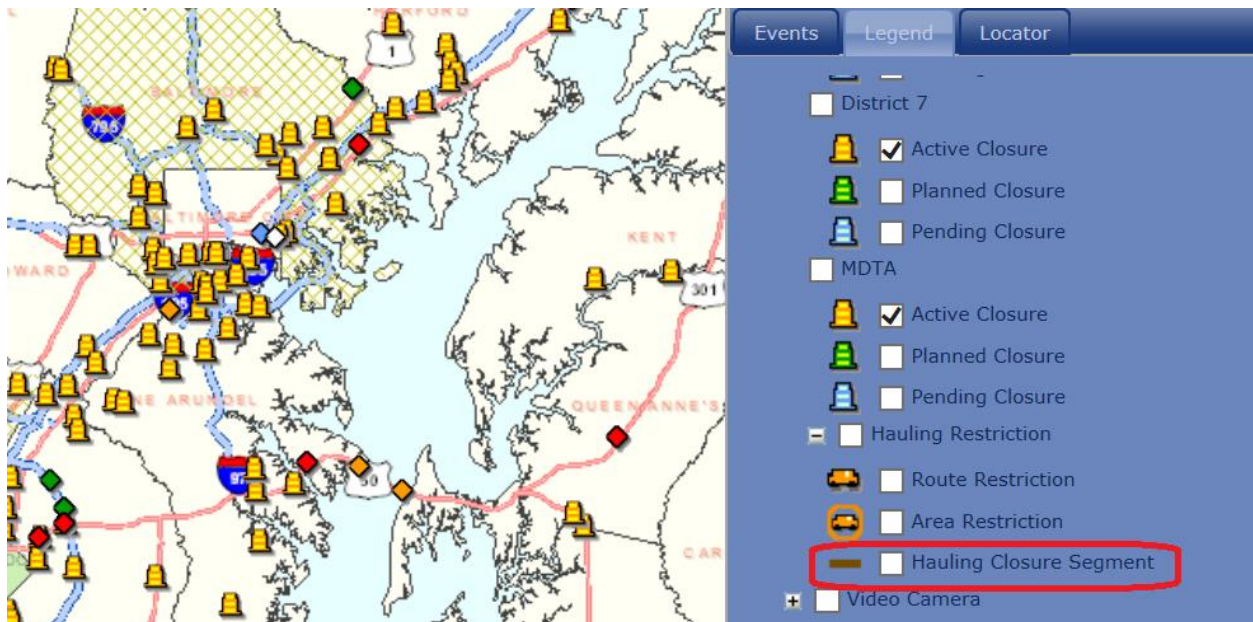
4.1.4.2 Closure Segment removal from the legend

CHART Mapping R15 will provide changes to the Intranet Map legend to remove the display of Closure Segments for Active, Planned and Pending lane closure permits on the Intranet Map. See the Closure Segments legend level being removed in the picture below indicated by the red cross.



4.1.4.3 Move of Hauling Restriction Closure Segment

CHART Mapping R15 will provide changes to the Intranet Map legend to relocate the Hauling Closure Segment under the Roadwork level. See picture below with the changed legend for the Intranet Map.



5 Deprecated Functionalities

5.1 LCP

Currently the LCP application provides lane closure data to the CHARTWeb database using a schedule MSSQL Server task that runs every 2 minutes. This task will be removed and replaced with the new CHART Intranet Map functionality implemented via the LCP Data Exporter and the CHART Intranet Map exporter client.

6 Acronyms/Glossary

LCP	Lane Closure Permits application used to manage SHA and MDTA lane closure permitting.
Home Page	The main page of the LCP application, always open if the user is logged in.
Permit	An LCP permit, providing information about roadwork that is permitted to take place.
RAM	Roadway Approval Manager
DPT	District Approval By Permit Type
WML	Workflow Manager Log
GIS	Geographic Information System (GIS) is any system that captures, stores, analyzes, manages, and presents data that are linked to location
Intranet Map	The CHART Mapping application that is not integrated into the CHART user interface.
REST	Representational State Transfer - a web services architecture style used in CHART that leverages web technologies such as http and XML

7 LCP Phase 3 Design Mapping To Requirements

7.1 LCP Phase 3 Design Mapping To Software Requirements

LCP Phase 3 Software Requirements

Tag	Text	Use Case	Design Diagram	Other Design Elements Release Implemented
Permit Archive/Server Jobs				
SR 75	When new permits are created they enter the EORS Lane Closures workflow. In general all new permits will be placed in the Pending state when they are created in the system. However, Construction and Shop Maintenance permits will always begin as Approved permits.	N/A	N/A	N/A
SR75.8	The Archived state shall represent a permit that has been expired for more than 60 days and has been moved to an archive location in the database.	Archived state after 60 days	N/A	N/A
SR89	A user shall have the ability to search and create reports from the permit archive. The permit archive is where expired permits are permanently stored. Permits from the permit archive may be copied into new permits for the purpose of creating a new permit.	Search Permits, Include Archived Permits	PermitController.PermitsPage	Figure 4 8. The Search Permits Page Showing the All Filters Search Options. Figure 4 14. The All Filters Search Showing the Include Archived Permits Dialog. Figure 4 15. The All Filters Search Showing the Results of a Search That Includes Archived Permits.
SR89.1	The system shall move expired permits to the permit archive for permanent storage after the permit has been expired for more than 60 days. Permits stored in the archive cannot be modified.	Not allow permits stored in the Archive to be edited or deleted	N/A	N/A
SR89.4	The application shall provide the ability to view and report on the history of a permit	View Permit Details	N/A	Figure 4 16. The Permits Table Showing the Options Drop-Down for an Archived Permit.
SR89.5	The system shall provide the ability to view or print permits	View Permit Details	N/A	Figure 4 16. The Permits Table Showing the Options Drop-Down for an Archived Permit.

SR89.10	The system shall store the archive data in such a way as to be able to move the data to an external data store in the future.	Copy Archive Permit	N/A	N/A
SR89.12	The system shall provide the ability to create a new permit by copying an expired permit from the permit archive. This data will include the geospatial location data only if the permit is not a free-form permit.	Copy Permit	N/A	Figure 4 16. The Permits Table Showing the Options Drop-Down for an Archived Permit.
SR90	The application uses server jobs to automate certain aspects of the application. These jobs may run as scheduled tasks or as MSSQL Server scheduled jobs.	Archived state after 60 days	N/A	N/A
SR90.3	The system shall automatically set a permit state to Archived and move it to the archive if it has been Expired for more than 60 days.	Archived state after 60 days	N/A	N/A
Permit Search				
SR82	A user shall have the ability to list, sort and search through the permits in the system.	Search Permits	PermitController.PermitsPage	Figure 4 8. The Search Permits Page Showing the All Filters Search Options. Figure 4 9. The All Filters Search Showing the Results of a Search.
SR82.1	The system shall provide the ability to search for permits in the system.	Search Permits	PermitController.PermitsPage	N/A
SR82.1.13	The system shall perform a search using more criteria than just tracking number when the user presses the search button.	Search Permits	N/A	Figure 4 8. The Search Permits Page Showing the All Filters Search Options. Figure 4 9. The All Filters Search Showing the Results of a Search.
SR82.1.13.1	The system shall allow the user to specify that the search should include or exclude archived permits.	Search Permits, Include Archived Permits	N/A	Figure 4 14. The All Filters Search Showing the Include Archived Permits Dialog.
SR82.1.13.1.1	The system shall indicate to the end user that any search that includes archived permits may take substantially longer to complete.	Search Permits, Include Archived Permits	N/A	Figure 4 14. The All Filters Search Showing the Include Archived Permits Dialog.

SR82.1.13.1.2	The system shall exclude archived permits from searches by default.	Search Permits, Include Archived Permits	N/A	Figure 4 8. The Search Permits Page Showing the All Filters Search Options.
SR82.1.13.1.3	The system shall provide a visual queue to display any archived permits that match the specified search criteria in a way that clearly indicates that the displayed permit is in the archived state.	Search Permits, Include Archived Permits	N/A	Figure 4 15. The All Filters Search Showing the Results of a Search That Includes Archived Permits.
SR82.1.13.1.4	The system shall include a button that resets the search form to its default values.	Search Permits	N/A	Figure 4 8. The Search Permits Page Showing the All Filters Search Options.
SR82.1.14	The system shall suggest current (non-archived) permits by tracking number as the user types a tracking number.	Find Permit, Find Permit by Tracking Number	TrackingNumberRepository.Initialize, TrackingNumberRepository.Refresh, TrackingNumberRepository.Find	Figure 4 2. The Search Permits Page Showing the Tracking Number Auto-Complete Box. Figure 4 3. The Tracking Number Auto-Complete Box Showing Matching Tracking Numbers.
SR82.1.14.1	The tracking number search field shall be presented on the search page in an area separate from the other search criteria to inform users that the field behaves differently from the other criteria (it will auto suggest permits).	Find Permit, Find Permit by Tracking Number	TrackingNumberRepository.Find	Figure 4 2. The Search Permits Page Showing the Tracking Number Auto-Complete Box.
SR82.1.14.3	The system shall suggest any current (non-archived) permit with a tracking number whose last set of characters including the four digit year and hyphen starts with exactly the characters the user has typed into the tracking number search field.	Find Permit, Find Permit by Tracking Number, Auto-Suggest Search Feature	TrackingNumberRepository.Find	Figure 4 6. Searching for a Tracking Number by the Four-Digit Year. Figure 4 7. Searching for a Tracking Number by the Digits Following the Year.
SR82.1.14.4	The system shall suggest any current (non-archived) permit with a tracking number whose last set of characters following the four digit year hyphen starts with exactly the characters the user has typed into the tracking number search field	Find Permit, Find Permit by Tracking Number, Auto-Suggest Search Feature	TrackingNumberRepository.Find	Figure 4 6. Searching for a Tracking Number by the Four-Digit Year. Figure 4 7. Searching for a Tracking Number by the Digits Following the Year.

SR82.1.14.5	The system shall never suggest archived permits as the user types a tracking number.	Find Permit, Find Permit by Tracking Number, Auto-Suggest Search Feature	TrackingNumberRepository.Fin d	N/A
SR82.1.14.6	The system shall suggest any current (non-archived) permit with a tracking number that starts with exactly the characters the user has typed into the tracking number search field.	Find Permit, Find Permit by Tracking Number, Auto-Suggest Search Feature	N/A	N/A
SR82.5	The system shall provide search results for both archived and non-archived permits.	Search Permits, Display Permit Search Results	N/A	Figure 4 15. The All Filters Search Showing the Results of a Search That Includes Archived Permits.–
SR82.6	The system shall provide a visual queue that easily distinguishes archived and non-archived permit in the search results.	Search Permits, Display Permit Search Results	N/A	Figure 4 15. The All Filters Search Showing the Results of a Search That Includes Archived Permits.–
SR89.7	The system shall provide the ability for a user to search for permits by county or district when searching the permit archive.	Search Permits, Filter Permits, Filter by District, Filter by County	PermitController.PermitsPage	Figure 4 8. The Search Permits Page Showing the All Filters Search Options.
SR89.8	The system shall provide the ability for a user to search for permits by primary routes when searching the permit archive.	Search Permits, Filter Permits, Filter by Route Type, Filter by Route Number	PermitController.PermitsPage	Figure 4 8. The Search Permits Page Showing the All Filters Search Options.
SR89.11	The system shall provide the ability for a user to search for permits by date range when searching the permit archive.	Search Permits, Filter Permits, Filter by Date, Filter by Date Range	PermitController.PermitsPage	Figure 4 8. The Search Permits Page Showing the All Filters Search Options.

Web Services				
SR92	The Lane Closures application shall provide the ability for external applications to retrieve data from the EORS Lane Closures system as well as perform permitted actions.	Approved	FALSE	1.0.0 1.0.0
SR92.1	The EORS Lane Closure application web service shall provide the ability to query EORS permit inventory data.	Query Permit	InitializeWebService ProcessBaseRequest	N/A
SR92.1.1	The Lane Closures application shall provide the ability for external applications to request a full inventory of permit data from the Lane Closures system for permits that are in the pending, queued, approved or active state.	Query Permit, Full Inventory	ProcessBaseRequest, ProcessRequest	N/A
SR92.1.2	The Lane Closures application shall provide the ability for external applications to request a partial inventory of permit data from the Lane Closures system for permits that are in the pending, queued, approved or active state.	Query Permit, Partial Inventory	ProcessBaseRequest, ProcessRequest	N/A
SR92.1.3	The EORS Lane Closure application web service shall provide the ability to request any permits that have changed within a specified lookback time for permits that are in the pending, queued, approved or active state.	Query Permit	ProcessBaseRequest, ProcessRequest	N/A
SR92.2	The EORS Lane Closure application web service shall provide the ability for a client application to subscribe to permit data.	Subscribe	UpdateSubscription, GetSubscriptionFromDatabase	N/A
SR92.2.1	The EORS Lane Closure application web service shall push any changes in a timely manner (compared to periodic polling).	Notify Client Permit Data Changed	PushDataChangedEvent	N/A
SR92.2.2	The Lane Closure application web service shall push data related to permit creation, deletion or edit events to users subscribed to the web service.	Notify Client Permit Data Changed	PushDataChangedEvent	N/A

SR92.6	The EORS Lane Closure Web Service shall require external applications to authenticate before any data is passed.	Query Permit, Subscribe	ProcessBaseRequest, Authenticate, verifySignedData	3.0.0 3.0.0
SR92.7	Lane Closures web service shall provide the ability for the client application to notify LCP of changes to the permit location.	Notify Location Changed	ProcessBaseRequest, ProcessRequest	N/A
SR92.8	The Lane Closure Web Service shall provide a logging system that will log the relevant actions taken by Web Service.	Log action taken by Web Service	ProcessBaseRequest, ProcessRequest, UpdateSubscription, GetSubscriptionFromDatabase	N/A
SR92.8.1	The Lane Closure Web Service shall provide a logging system that will log the relevant actions taken by the Mapping application according to information that Map application provides to LCP through Web Service interfaces.	Log action taken by Web Service	ProcessBaseRequest, ProcessRequest, UpdateSubscription, GetSubscriptionFromDatabase	N/A
SR92.8.2	The Lane Closure Web Service shall provide a logging system that will log the relevant actions taken by the application's automation jobs for archiving permits.	Log action taken by Web Service	ProcessBaseRequest, ProcessRequest, UpdateSubscription, GetSubscriptionFromDatabase	N/A
PR7114: LCP: Update username and password rules				
SR71	The system shall provide the ability to manage users.	N/A	WO 34 UserAdmin/Create UserAdmin/Delete UserAdmin/Details UserAdmin/Edit UserAdmin/Index AccountController/GetPassword AccountController/GetUsername AccountController/LogOff AccountController/LogOn AccountController/Manage AccountController/MyProfile AccountController/Register	WO 34 UserManagement CD
SR71.3	The system shall provide the ability for a user to	PR7114 (Use Case	N/A	N/A

	request lost usernames and passwords associated with the email address of a system user account.	Diagram)		
SR71.3.1	The system shall generate simplified passwords for users when recovering lost passwords. The generated passwords shall be easy to read with characters and/or numbers and no special characters.	PR7114 (Use Case Diagram)	N/A	N/A
SR71.6	The system shall provide the ability to create a new user.	N/A	WO 34 UserAdmin/Create UserAdmin/Delete UserAdmin/Details UserAdmin/Edit UserAdmin/Index AccountController/GetPassword AccountController/GetUsername AccountController/LogOff AccountController/LogOn AccountController/Manage AccountController/MyProfile AccountController/Register	WO 34 UserManagement CD
SR71.6.1	The system shall impose requirements on allowable user names.	PR7114 (Use Case Diagram)Proposed	N/A	N/A
SR71.6.1.1	The system shall allow user name lengths from a minimum of 4 characters to a maximum of 32 characters.	Min: 4 Characters Max: 32 Characters	N/A	N/A
SR71.6.1.2	User names shall not contain certain characters. Invalid characters are " / \ [] : ; = , + * ? < > User names can contain all other special characters, including spaces, periods, dashes, and underscores.	PR7114 (Use Case Diagram)	N/A	N/A
SR71.9	The system shall provide the ability to manage user accounts.	Approved	WO 34 UserAdmin/Create UserAdmin/Delete UserAdmin/Details UserAdmin/Edit UserAdmin/Index AccountController/GetPassw	WO 34 UserManagement CD

			ord AccountController/GetUser ame AccountController/LogOff AccountController/LogOn AccountController/Manage AccountController/MyProfile AccountController/Register	
SR71.9.6	The System shall provide the ability to change user's passwords.	Allow Previous Password Re-Use	N/A	N/A
SR71.9.6.3	The system shall impose requirements on allowable user passwords.	Require: 1 capital, 1 lower case, Min: 8 Max: 32 characters	N/A	N/A
SR71.9.6.3.1	Passwords will require 1 capital letter, 1 lower case letter, a minimum length of 8 characters, a maximum length of 32 characters, allow special characters but not require them, disallow the use of whitespace.	Require: 1 capital, 1 lower case, Min: 8 Max: 32 characters	N/A	N/A
SR71.9.6.3.2	The system shall allow the reuse of previous passwords.	Allow Previous Password Re-Use	N/A	N/A
7118: LCP: LCP export to ATMS not providing data for all permits				
SR74	A user will have the ability to create a new Lane Closure Permit in the application. The permit will then enter the Lane Closures Permit workflow that governs the actions that can be performed on the permit. See the section on Permit Workflow for additional details.	N/A	N/A	N/A

SR74.16	The system shall provide the ability to select from a general list of lane, shoulders, tunnel bores and toll booth lanes from which any combination of are allowed to be closed when the permit is in the Active state.	N/A	N/A	N/A
SR74.16.1	The system shall store the lane configuration data as a simple text string (as opposed to a bit mask representation) for consumption by an ATMS database view.	N/A	N/A	N/A

7.2 LCP Phase 3 Mapping Application Design Mapping To Software Requirements

Tag	Text	Use Case	Sequence Diagram	Other Design Elements
SR6	Detailed Map Layer Requirements	N/A	N/A	N/A
SR6.29	LCP Closures	N/A	N/A	N/A
SR6.29.1	LCP Active Lane Closure	N/A	N/A	N/A
SR6.29.1.5	Legend display	N/A	N/A	N/A
SR6.29.1.5.1	The system shall display an entry to select LCP Active Closure in the legend under the main Traffic level.	N/A - unchanged for R15	N/A	N/A
SR6.29.1.5.4	The system shall display an entry to select LCP Active Closure by District in the legend under the Road Work level.	N/A - unchanged for R15	N/A	N/A
SR6.29.1.5.4.1	The system shall display active closure node for each district in the legend.	View Permit by district	N/A	N/A
SR6.29.1.5.4.2	The system shall display the following districts in the legend for selection: District 1, District 2, District 3, District 4, District 5, District 6, District 7 and MDTA (Maryland Transportation Authority).	View Permit by district	N/A	N/A
SR6.29.1.5.4.3	The system shall select LCP Active Closure in the legend when the display is set for Traffic tab.	N/A - unchanged for R15	N/A	N/A
SR6.29.1.5.4.4	The system shall select LCP Active Closure in the legend when the display is set for Road Work tab.	N/A - unchanged for R15	N/A	N/A
SR6.29.1.6	Map display	N/A	N/A	N/A

Tag	Text	Use Case	Sequence Diagram	Other Design Elements
SR6.29.1.6.1	The system shall display active road closures on the map for all districts by default. Each closure should be displayed as point symbol at the starting location of the closure.	N/A - unchanged for R15	N/A	N/A
SR6.29.1.6.2	The starting point should be represented by icon.	N/A	N/A	N/A
SR6.29.1.7	Tooltip display	N/A	N/A	N/A
SR6.29.1.7.1	When user mouse moves over the icon, tool tip shall display the following road closure information: <ul style="list-style-type: none"> - Tracking Number - Route Info - County - Permit info: <ul style="list-style-type: none"> o Permit type o TCS number o Reason o Contact name o Submitted date - Closure time period: <ul style="list-style-type: none"> o Starting date o Ending date o Starting hour o Ending hour Status Remarks Approval info Closed lanes 	N/A - unchanged for R15	N/A	N/A
SR6.29.2	LCP Planned Lane Closure	N/A	N/A	N/A
SR6.29.2.6	Legend display	N/A	N/A	N/A
SR6.29.2.6.3	The system shall display an entry to select LCP Planned Closure by District in the legend under the Road Work level.	View Permit by district	N/A	N/A
SR6.29.2.6.3.1	The system shall display planned closure node for each district in the legend.	View Permit by district	N/A	N/A
SR6.29.2.6.3.2	The system shall display the following districts in the legend for selection: District 1, District 2, District 3, District 4, District 5, District 6, District 7 and MDTA (Maryland Transportation Authority).	View Permit by district	N/A	N/A
SR6.29.2.6.3.3	The system shall select LCP Planned Closure for each district in the legend when the display is set for Road Work tab.	N/A - unchanged for R15	N/A	N/A
SR6.29.2.7	Map display	N/A	N/A	N/A
SR6.29.2.7.1	The system shall show planned road closures on the map for all districts by default. Each closure should be displayed as a point	N/A	N/A	N/A

Tag	Text	Use Case	Sequence Diagram	Other Design Elements
	symbol at the starting location of the closure.			
SR6.29.2.7.2	The starting point should be represented by icon.	N/A	N/A	N/A
SR6.29.2.7.3	The system shall cluster the Closure icons based on the relative distances and extents when clustering is enabled.	N/A	N/A	N/A
SR6.29.2.8	Tooltip display	N/A	N/A	N/A
SR6.29.2.8.1	When user mouse moves over the icon, tool tip shall display road closure information that includes county, tracking number, permittee information, permit type, tcs number, reason, contact name, date submitted, closure date, closure time, status, remarks, date approved, approval name and lanes closed.	N/A - unchanged for R15	N/A	N/A
SR6.29.3	LCP Pending Lane Closure	N/A	N/A	N/A
SR6.29.3.5	Legend display	N/A	N/A	N/A
SR6.29.3.5.3	The system shall display an entry to select LCP Pending Closure by District in the legend under the Road Work level.	View Permit by district	N/A	N/A
SR6.29.3.5.3.1	The system shall display list of districts for selection under the pending closure node in the legend.	View Permit by district	N/A	N/A
SR6.29.3.5.3.2	The system shall display the following districts in the legend: District 1, District 2, District 3, District 4, District 5, District 6, District 7 and MDTA (Maryland Transportation Authority).	View Permit by district	N/A	N/A
SR6.29.3.6	Map display	N/A	N/A	N/A
SR6.29.3.6.1	The system shall show pending road closures that wait for approval on the map for all districts by default. Each closure should be displayed as point feature at the starting location of the closure.	N/A	N/A	N/A
SR6.29.3.6.2	The starting point should be represented by icon.	N/A	N/A	N/A
SR6.29.3.7	Tooltip display	N/A	N/A	N/A
SR6.29.3.7.	When user mouse moves over the	N/A - unchanged for	N/A	N/A

Tag	Text	Use Case	Sequence Diagram	Other Design Elements
1	icon, tool tip shall display the following road closure information: - Tracking Number - Route Info - County Permit info: o Permit type o TCS number o Reason o Contact name o Submitted date - Closure time period: o Starting date o Ending date o Estimated reopen time - Status - Remarks Approval info - Closed lanes	R15		
SR7	Map Task Extension Requirements	N/A	N/A	N/A
SR7.11	Hauling Restrictions Layer	N/A	N/A	N/A
SR7.11.12	Legend Display	N/A	N/A	N/A
SR7.11.12.1	The system shall display an entry to select Hauling Restrictions in Road work level.	N/A - unchanged for R15	N/A	N/A
SR7.11.12.1.3	The system shall display an entry to select Hauling Closure Segments.	N/A	N/A	N/A
SR7.11.13	Map Display	N/A	N/A	N/A
SR7.11.13.5	The system shall show Hauling Closure segments on the map displayed as a line symbol.	N/A	N/A	N/A
SR7.11.13.5.1	The route restriction segments are displayed with brown lines.	N/A	N/A	N/A
SR7.11.13.6	The system shall show Route Restrictions on the map displayed as a point symbol.	N/A - unchanged for R15	N/A	N/A
SR7.11.13.6.1	The starting point for route restriction should be represented by an orange truck icon.	N/A	N/A	N/A
SR7.11.13.7	The system shall show Area Wide Route Restrictions on the map displayed as a point symbol.	N/A - unchanged for R15	N/A	N/A
SR7.11.13.7.1	The area wide route restriction should be represented by an circled orange truck icon.	N/A	N/A	N/A
SR7.11.14	Tooltip Display	N/A	N/A	N/A
SR11	External System Synchronization Requirements	N/A	N/A	N/A
SR11.1	ATMS Synchronization	N/A	N/A	N/A
SR11.1.10	Synchronize Add Event	Synchronize Add Events	CHART Data Exporter Synchronization SD	N/A

Tag	Text	Use Case	Sequence Diagram	Other Design Elements
SR11.1.11	Synchronize Update Event	Synchronize Update Events	CHART Data Exporter Synchronization:UpdateInventory() SD	N/A
SR11.1.12	Synchronize Remove Event	N/A	N/A	N/A
SR11.8	Lane Closure Permits Synchronization	Export Client	N/A	N/A
SR11.8.1	The system shall support import of all lane closure permits from the external system LCP.	Import Permits	Process Permit Inventory, Export Client Classes	N/A
SR11.8.1.1	The synchronization application shall add an entry to the permits table if a new LCP permit is found.	Create new permits in database	Process Permit inventory, Export Client classes	N/A
SR11.8.1.2	The synchronization application shall update an entry based on the unique permit ID in the database table if the LCP permit contents change.	Update permits in database	Process Permit Inventory, ExportClient classes	N/A
SR11.8.1.3	The synchronization application shall remove an entry based on the unique permit ID in the database table if a LCP permit has been removed from the full inventory message.	Remove permit from database	Process Permit Inventory, Export Client classes	N/A
SR11.8.2	The system shall subscribe to the external system LCP for notification of lane closure permit additions, deletions and updates.	Send subscription request to LCP web service	N/A	N/A
SR11.8.2.1	The system shall resynchronize its lane closure permits whenever the export client receives a permit changed event.	Handle permit changed event	Process Permit Change, Export Client classes	N/A
SR11.8.2.1.1	The system shall add new permits determined in the permit changed event.	Create new permits in database	Process Permit Change, Export client classes	N/A
SR11.8.2.1.2	The system shall update existing permits determined in the permit changed event.	Update permits in database	Process Permit Change, Export Client classes	N/A
SR11.8.3	The system shall maintain all the necessary information acquired from the external system for the LCP permits that includes permit ID, tracking number, permit type, TCS number, reason, date submitted, contact name, permittee office name, permittee field name, coordinate with name,	Import Permits	Process Permit Change, Export Client classes	N/A

Tag	Text	Use Case	Sequence Diagram	Other Design Elements
	approval name, approval date, start and end county names, roadway location, start and end dates, remarks, permit status, from and to time, direction, closure description, lane configuration description, lane configuration image, days closed, public comments, extension time (if any), SHA district number and last update time.			
SR11.8.4	The system shall have the ability to periodically request a full inventory of currently open permits from LCP.	Send on demand request to LCP	N/A	N/A
SR11.8.4.1	The system shall resynchronize all lane closure permits and delete obsolete permits whenever a full, complete permit inventory message is received.	Handle permit inventory	Process Permit change	N/A
SR11.8.6	The system shall notify the external system LCP whenever an operator changes the geographical location of the lane closure permit.	Map permit	Save Permit SD, CHARTMap_Bizlogi c class diagram	N/A
SR11.8.7	The system shall notify the external system LCP whenever an operator unmaps (deletes) the geographical location of the lane closure permit.	Unmap permit	Unmap permit SD, CHARTMap_bizlogi c class diagram	N/A

8 Use Case Diagrams

8.1 Permit Archive/Server Jobs (Use Case Diagram)

This diagram shows the features of the Permit Archive/Server Jobs module.

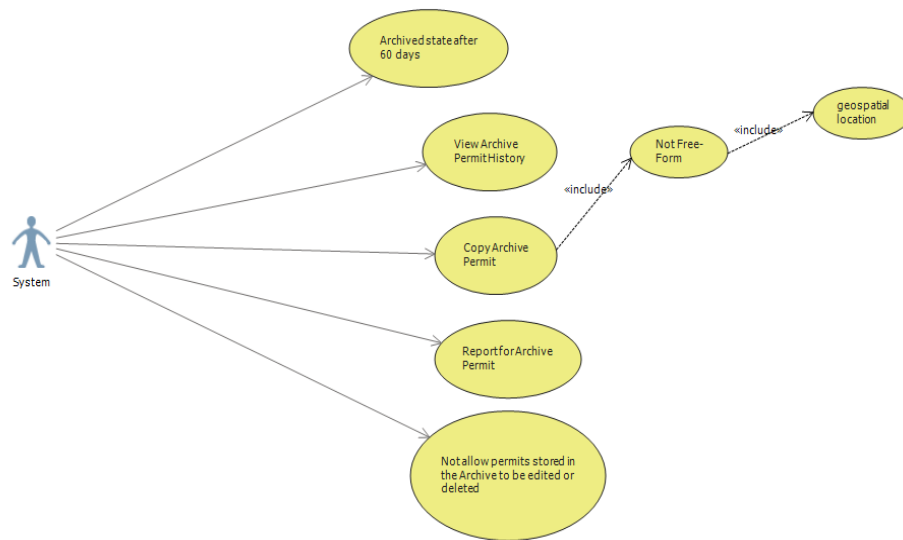


Figure 8-1 Permit Archive

8.1.1 Archive State After 60 Days (Use Case)

A permit which has been in the Expired state for more than 60 days will be moved to the permit archive using a daily scheduled MSSQL Server Job.

8.1.2 View Archive Permit History (Use Case)

Provides the ability to view the history of an archived permit using the permit details user interface.

8.1.3 Copy Archive Permit (Use Case)

Provides the ability to copy the data from an archived permit into the input fields of the Create Permit wizard. Includes both stand (including latitude and longitude data) and free-form permit (without latitude or longitude data)

8.1.4 Report For Archived Permits (Use Case)

Provides the standing permit details reports for an archived permit with and without history.

8.1.5 Not Allow Permits Stored In Archive To Be Edited Or Deleted(Use Case)

Maintain permit archive integrity by preventing the editing or deleting or archived permit data.

8.2 Search Permits (Use Case Diagram)

This diagram shows the features of the Search Permits module.



Figure 8-2 Search Permits Use Case.

8.2.1 Search Permits (Use Case)

The Search Permits page will contain an area for the user to enter search criteria (i.e. search filters) and search for all permits that match the specified criteria. When the page first loads, the District filter will be pre-filled with the user's Primary District and all of the permit state checkboxes will be selected (i.e. Active, Approved, Queued, Pending, Deleted, Rejected, and Expired). A user can search for permits by specifying any valid combination of the available search filters including: District, County, Route Type, Route Number, Permit Type, Tracking Number, Contract Number, Date, Date Range, and Time. The system shall provide the ability to search for permits by date range where the date range and the permit range overlap. The Contract Number input will be an auto-suggest feature. New for LCP Phase 3, archived permits can be included in the search.

The search permits output will be displayed in a sortable table. Output columns for permit search results shall include Permit State, Tracking Number, Dates, Times, Route, and Location. Each permit in the table will have an options menu where a user can activate the permit, delete the permit, or view to the permit's details.

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Figure 8-3 Find Permit Use Case

8.2.2 Find Permit (Use Case)

The Find Permit page will allow a user to find a permit based on the tracking number. The following three approaches can be used to search for a tracking number using the tracking

number auto-complete box: a) search by the entire tracking number starting with the letter D, b) search by the four digit year, followed by a dash, followed by one or more numbers, or c) search by a dash followed by one or more numbers. When a tracking number is selected, the details for the permit will be displayed on the page.

8.3 LCP Data Exporter (Use Case Diagram)

The Lane Closures application shall provide the ability for external applications to retrieve data from the Lane Closures system for permits that are in the pending, queued, approved or active state.

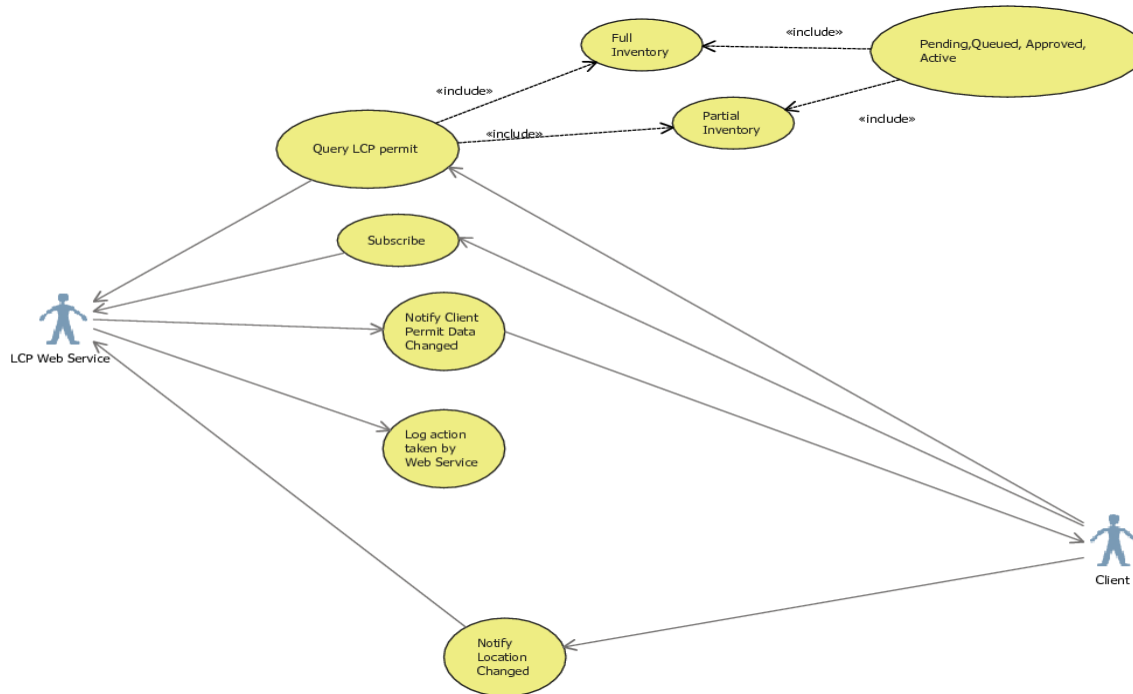


Figure 8-4 LCP Data Exporter

8.3.1 Query LCP Permit (Use Case)

The Lane Closure application web service shall provide the ability to query LCP permit inventory data system for permits that are in the pending, queued, approved or active state.

The Lane Closure application Data Exporter shall provide the ability to request full and partial inventory system for permits that are in the pending, queued, approved or active state.

8.3.1 Subscribe (Use Case)

The Lane Closure application Data Exporter shall provide the ability for a client application to subscribe to permit data.

8.3.2 Notify Client Permit Data changed (Use Case)

The Lane Closure application Data Exporter shall push data related to permit creation, deletion or edit events to users subscribed to the web service.

8.3.3 Notify Location Changed (Use Case)

Lane Closures Data Exporter shall provide the ability for the client application to notify LCP of changes to the permit location.

8.3.4 Log Action taking by WebService (Use Case)

The Lane Closure Data Exporter shall provide a logging system that will log the relevant actions taken by Data Exporter. The Lane Closure Data Exporter shall provide a logging system that will log the relevant actions taken by the Map application according to information that Map application provides.

The Lane Closure Data Exporter shall provide a logging system that will log the relevant actions taken by the application's automation jobs.

8.4 PR7114 (Use Case Diagram)

This diagram shows the features of the PR7114.

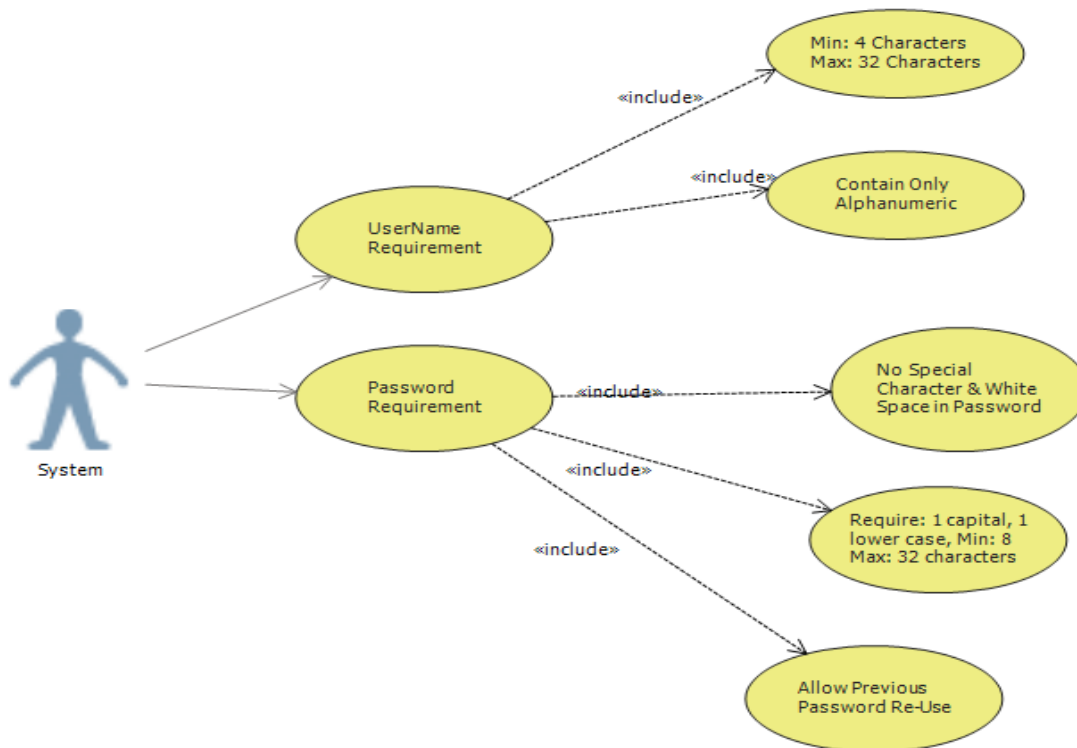


Figure 8-5 PR7114

8.5 Intranet Map (Use Case Diagram)

This diagram shows "new" functionality being added to the Intranet Map and Mapping EORS Web Service for R15. The operator shall be able to filter by districts the permits that they wish to view on the map display. The system shall provide filters for the following districts on the Intranet Map legend: District 1, District 2, District 3, District 4, District 5, District 6, District 7 and MDTA (Maryland Transportation Authority).

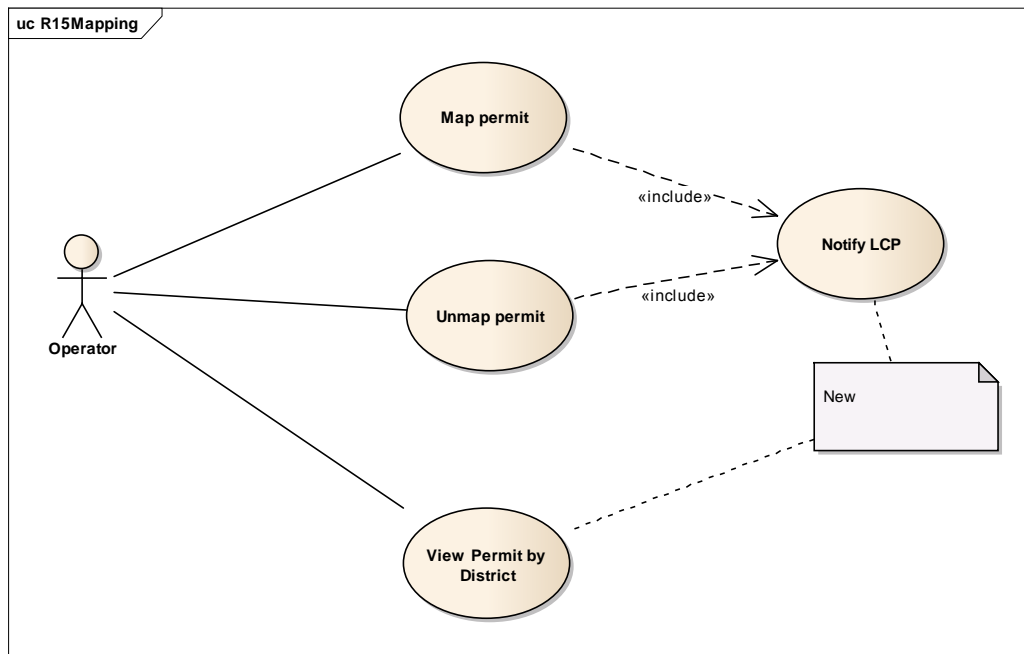


Figure 8-6 R15Mapping

8.5.1 Map permit

An operator can assign a new geographical location to a permit using the map display.

8.5.2 Notify LCP

The system shall notify the external system LCP when a permit is either mapped or unmapped.

8.5.3 Unmap permit

An operator can remove the geographical location for the permit using the map display.

8.5.4 View Permit by District

An operator can view permits for the selected districts.

8.6 Export Client

This diagram shows functionality being added to the Export Client for Mapping R15 to Import permits from the external source LCP. The prime responsibility would be to periodically import all the permits and to subscribe for changes that occur for permits.

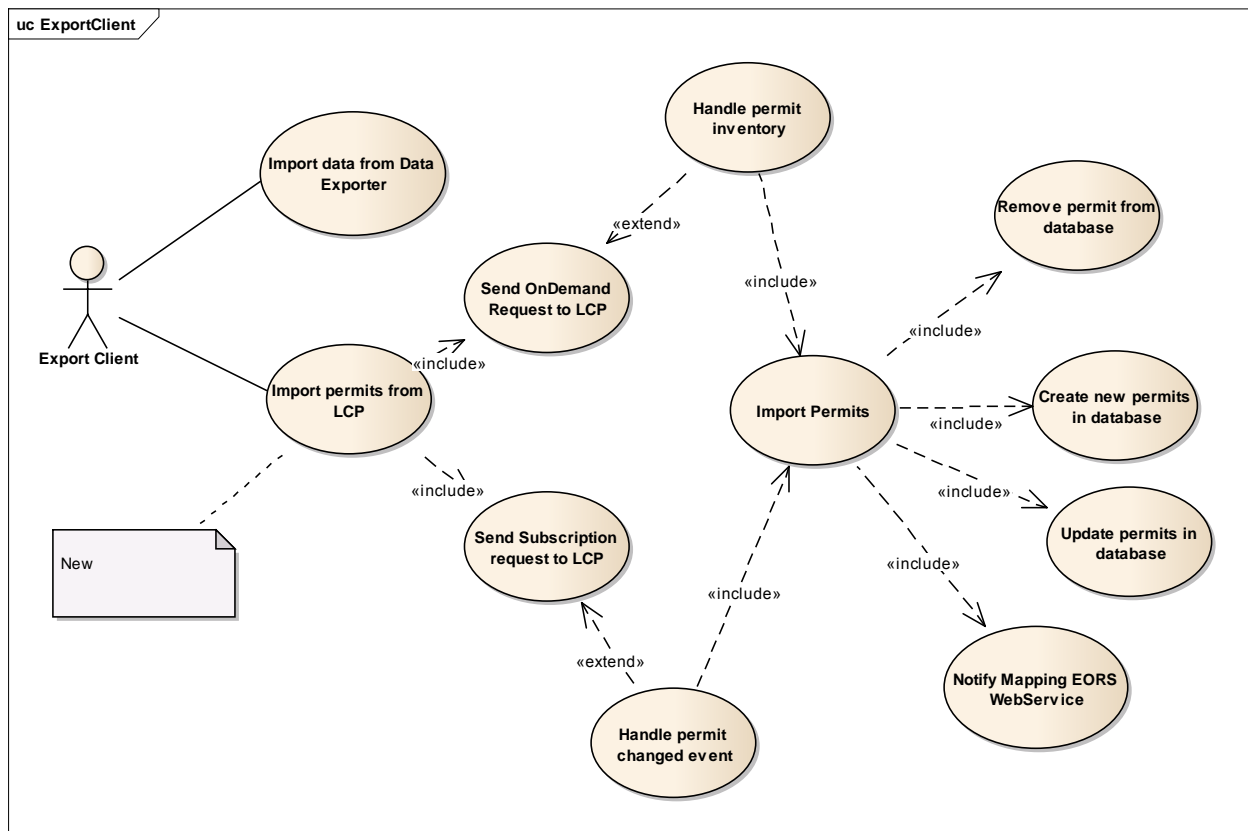


Figure 8-7 Export Client

8.6.1 Create new permits in database

Any new permits received from the external source LCP will be added to the cache maintained in the CHARTWeb database.

8.6.2 Handle permit changed event

Initiated to handle the changes to a permit whenever a subscription update is received from the LCP Data Exporter.

8.6.3 Handle permit inventory

Initiated to handle the full inventory received from the LCP Data Exporter. This includes add any new permits, updating existing permits, and removing deleted/expired permits.

8.6.4 Import Permits

Permits received from the external system LCP will be processed and saved in a cache maintained in the system database.

8.6.5 Import data from Data Exporter

The Export Client shall provide access to CHART Data Exporter via web service to allow import ATMS data available to third parties. All requests made by Export Client shall be validated against published XSD. CHART will return a response XML document for each request. The XML returned will contain an error code and error text for invalid requests, and will return the requested data for valid, authorized requests.

8.6.6 Import permits from LCP

The Export Client shall import permits from the external system LCP via a web service interface. All requests/responses made or received by the Export Client shall be validated against a published XSD.

8.6.7 Notify Mapping EORS WebService

The system will notify the Mapping EORS web service whenever a new permit is received or an existing permit changes geographical locations. The Mapping EORS web service will be responsible for creating the spatial objects for display on the Intranet Map that includes barrels and closure line segments.

8.6.8 Remove permit from database

Any expired or deleted permits received from the external source LCP will be removed from the cache maintained in the CHARTWeb database.

8.6.9 Send OnDemand Request to LCP

The Export Client will periodically send an on demand request to the external system LCP so as to synchronize its cache of permits.

8.6.10 Send Subscription request to LCP

The Export Client will subscribe to the external system LCP to listen to any changes that may have occurred for the permits. Any new permits received will be added, changes to existing permits will be saved, expired permits will be removed from the cache maintained in the system database.

8.6.11 Update permits in database

Any updates to existing permits received from the external source LCP will be saved in the CHARTWeb database. Expired permits that are no longer in the feed will be removed from the cache.